# SAF-RC-032 100-F Remaining Sites Burial Grounds -**Soil Full Protocol** FINAL VALIDATION PACKAGE

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Jeanette Duncan (2) H9-02

**COMMENTS:** 

**EDMC** 

**SDG K0297** 

SAF-RC-032

**Waste Site: 1607-F-7** 

Date: 2 June 2006

To: Washington Closure Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: 100-F Remaining Sites Burial Grounds - Soil Full Protocol - Waste

Sites 1607-F-7

Subject: PCB/Pesticide - Data Package No. K0297-LLI

### INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Samo de la Maria | e Sala de Bajero |      | Validation | Date       |
|------------------|------------------|------|------------|------------|
| J11VJ3           | 4/4/06           | Soil | С          | See note 1 |
| J11VJ4           | 4/4/06           | Soil | С          | See note 1 |
| J11VJ5           | 4/4/06           | Soil | С          | See note 1 |
| J11VJ6           | 4/4/06           | Soil | С          | See note 1 |
| J11VJ7           | 4/4/06           | Soil | С          | See note 1 |
| J11VJ8           | 4/4/06           | Soil | С          | See note 1 |

<sup>1 -</sup> PCBs by 8082 & pesticides by 8081.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

### DATA QUALITY OBJECTIVES

### Holding Times

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-

detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

#### · Method Blank

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank results were acceptable.

### Field Blanks

No field blanks were submitted for analysis.

#### Accuracy

### Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike, matrix spike duplicate or LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

Due to surrogate recoveries outside QC limits, all detected pesticide results in samples J11VJ3, J11VJ7 and J11VJ8 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike or matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other precision results were acceptable.

### Field Duplicate Samples

One set of field duplicate samples (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All toxaphene results exceeded the RQL. Under the WCH statement of work, no qualification is required.

### Completeness

Data Package No. K0297 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to surrogate recoveries outside QC limits, all detected pesticide results in samples J11VJ3, J11VJ7 and J11VJ8 were qualified as estimates and flagged "J".
- Due to the lack of a matrix spike, matrix spike duplicate or LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All toxaphene results exceeded the RQL. Under the WCH statement of work, no qualification is required.

### **REFERENCES**

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

### PCB DATA QUALIFICATION SUMMARY\*

| SDG KOPONIP NESERIA             |           | Spiges 1607 F742         | RAGE 1 OF 1            |
|---------------------------------|-----------|--------------------------|------------------------|
| COMMENTS:                       |           |                          |                        |
| COMPOUND                        | QUALIFIER | SAMPLES AFFECTED         | REASON                 |
| All detected pesticide analytes | J         | J11VJ3, J11VJ7<br>J11VJ8 | Surrogate recovery     |
| Toxaphene                       | J         | All                      | No MS/MSD/LCS analysis |

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

# Appendix 3

**Qualified Data Summary and Annotated Laboratory Reports** 

| Project: WASHINGTON CL              | OSURE  | HANFORE    | ,            | İ          |              |         |              |             |             |             |       |            |          |
|-------------------------------------|--------|------------|--------------|------------|--------------|---------|--------------|-------------|-------------|-------------|-------|------------|----------|
| Laboratory: LLI                     | SDG: K |            |              |            |              |         |              |             |             |             |       |            |          |
| Sample Number                       | 10     | J11VJ3     |              | J111VJ4    |              | J11VJ5  |              | J11VJ6      |             | J11VJ7      |       | J11VJ8     |          |
| Remarks                             |        |            |              | Duplicate  | -            |         |              |             |             |             |       |            |          |
| Sample Date                         |        | 4/4/06     |              | 4/4/06     |              | 4/4/06  |              | 4/4/06      |             | 4/4/06      |       | 4/4/06     |          |
| Extraction Date                     |        | 4/17/06    |              | 4/17/06    |              | 4/17/06 |              | 4/17/06     |             | 4/17/06     |       | 4/17/06    |          |
| Analysis Date                       |        | 4/20/06    |              | 4/21/06    |              | 4/21/06 |              | 4/21/06     |             | 4/21/06     |       | 4/21/06    |          |
| РСВ                                 | RQL    | Result     | Q            | Result     | Q            | Result  | Q            | Result      | Q           | Result      | Q     | Result     | Q        |
| Aroclor-1016                        | 100    | 15         | υ            | 15         | U            | 15      | U            | 15          | U           | 15          | υ     | - 15       | IJ       |
| Aroclor-1221                        | 100    |            |              | 15         | υ            | 15      | U            | 15          |             | 15          | U     | 15         | U        |
| Aroclor-1232                        | 100    | 15         | Ū            | 15         | J            | 15      | U            | 15          | U           | 15          | Ü     | 15         | U        |
| Aroclor-1242                        | 100    |            |              | 15         | J            | 15      | Ū            | 15          | IJ          | 15          |       | 15         | U        |
| Aroclor-1248                        | 100    |            |              | 15         | U            | 15      | U            | 15          | Ū           | 15          | U     | 15         | υ        |
| Aroclor-1254                        | 100    | 15         | Ü            | 15         | U            | 15      | U            | 15          | U           | 15          | U     | 15         | U        |
| Aroclor-1260                        | 100    | 2.0        |              | 2.2        |              | 15      | U            | 4.2         |             | 7.0         |       | 10         |          |
|                                     | 1      | <u> </u>   |              |            |              |         |              |             |             |             |       |            |          |
|                                     |        |            |              |            |              |         |              |             |             |             |       |            |          |
| Sample Number                       |        | J11VJ3     |              | J111VJ4    |              | J11VJ5  |              | J11VJ6      |             | J11VJ7      |       | J11VJ8     |          |
| Remarks                             |        |            |              | Duplicate  |              |         |              | ]           |             |             |       |            |          |
| Sample Date                         |        | 4/4/06     |              | 4/4/06     |              | 4/4/06  |              | 4/4/06      |             | 4/4/06      |       | 4/4/06     |          |
| Extraction Date                     |        | 4/17/06    |              | 4/17/06    |              | 4/17/06 |              | 4/17/06     |             | 4/17/06     |       | 4/17/06    |          |
| Analysis Date                       |        | 4/24/06    |              | 4/24/06    |              | 4/24/06 |              | 4/24/06     |             | 4/24/06     |       | 4/24/06    | ,        |
| Pesticide                           | RQL    | Result     | Q            | Result     | Q            | Result  | Q            | Result      | Q           | Result      | Q     |            | Q        |
| Alpha-BHC                           | 5      |            |              | 1.5        |              | 1.5     | _            | 0.53        |             | 0.62        |       | 1.1        | <u> </u> |
| Gamma-BHC (Lindane)                 | 5      |            |              | 1.5        | υ            | 1.5     |              | 1.5         |             | 1.5         |       | 0.92       | _        |
| Beta-BHC                            | 5      |            |              | 3.1        | Ļ            | 1.5     | <del> </del> | 3.9         |             | 1.5         |       | 8.5        |          |
| Heptachlor                          | 5      |            |              | 1.5        |              | 1.5     | -            | 1.5         |             | 1.5         |       | 1.5        |          |
| Delta-BHC                           | 5      |            |              | 1.5        | _            | 1.5     | _            | 1.5         |             | 1.5         |       | 1.5        |          |
| Aldrin                              | 5      |            |              | 0.42       |              | 1.5     | -            | 1.5         |             | 1.5         |       | 1.5        |          |
| Heptachlor Epoxide                  | 5      |            |              | 1.5        | <del>,</del> | 1.5     |              | 1.5         |             | 1.5         |       | 1.5        |          |
| gamma-Chlordane                     | 5      |            |              | 1.1        | 1            | 1.5     |              |             | U           | 1.5         |       | 1.5        | -        |
| Endosulfan I                        | 5      |            |              | 0.46       |              | 1.5     |              | 0.46        | <del></del> | 0.54<br>1.5 |       | 1.5<br>1.5 |          |
| alpha-Chlordane                     | 5      |            |              | 1.7        | +            | 1.5     |              | 1.5         | U           | 2.1         |       | 1.5        |          |
| 4,4'-DDE                            | 5      |            | 1-           | 1.5        |              | 1.5     |              | 1.5         |             | 1.5         |       | 1.5        |          |
| Dieldrin                            | 5      |            |              | 1.5        |              | 1.5     | _            | <del></del> | U           | 1.5         |       | 1.5        |          |
| Endrin                              | 5      |            |              | 1.5        |              | 1.5     |              |             | U           | 1.5         |       | 1.5        |          |
| 4,4'-DDD                            | 5      |            |              |            |              | 1.5     |              |             | U           | 1.5         |       | 1.5        |          |
| Endosulfan II                       | 5      | +          |              | 1.5<br>5.2 |              | 1.5     |              | 4.5         | -           | 6.5         |       |            | J        |
| 4,4'-DDT                            | 5      |            | U            | 1.5        |              | 1.5     |              |             | U           | <del></del> | U     | 1.5        |          |
| Endrin Aldehyde                     | 5      |            |              | 1.5        |              | 1.5     |              | 0.76        |             | 1.1         |       | 1.5        |          |
| Endosulfan sulfate                  |        | 1.0        | 117          | 1.5        | · IO         | 1.5     |              |             |             |             |       |            | 4        |
| Mathamatar                          |        |            | i u          | 1.4        |              | 1 E     | do -         | 1 4 6       | : [ ] [     | 1 1 5       | ili i | 1 1 5      | 1119     |
| Methoxyclor                         | 5      | 1.5        |              | 1.4        | _            | 1.5     | +            | 1.5         |             |             | Ü     | 1.5        |          |
| Methoxyclor Endrin Ketone Toxaphene |        | 1.5<br>1.5 | U<br>U<br>UJ | 1.5        | UJ<br>U      | 1.5     | +            | 1.5         | n<br>n      | 0.89        |       | 1.5        |          |

### mionville Laboratory, Inc.

PCBs by GC

Report Date: 04/26/06 12:49 Client: TNUHAMFORD RC-032 K0297 Work Order: 11343606001 Page: 1 RFW Batch Number: 0604L712

|              | Cust ID:             | J11VJ3 | ļ.  | J11VJ3 | ļ        | J11VJ3          | L    | J11 <b>v</b> J4 | l     | J11VJ5 |       | J11VJ6 | 6   |
|--------------|----------------------|--------|-----|--------|----------|-----------------|------|-----------------|-------|--------|-------|--------|-----|
| Sample       | RPW#:                | 001    | L   | 001 NS | <b>1</b> | 001 <b>M</b> SI | )    | .002            |       | 003    |       | 004    | 4   |
| Information  | Matrix:              | SOIL   |     | SOIL   |          | SOIL            |      | SOIL            |       | SOIL   |       | SOIL   |     |
|              | D.F.:                | 1.0    | 00  | 1.0    | 0        | 1.0             | 0    | 1.0             | 0     | 1.0    | 0     | 1.0    |     |
|              | Units:               | UG/I   | KG  | UG/F   | CG .     | UG/H            |      | UG/K            |       | UG/X   | -     | UG/I   |     |
| Surrogate:   | Tetrachloro-m-xylene | 104    | *   | 112    | *        | 113             | *    | 107             | *     | 125 *  | ¥     | 112    | *   |
|              | Decachlorobiphenyl   | 104    | *   | 108    | ŧ        | 114             | *    | 102             | Ł     | 114    | ŧ     | 107    | ક   |
|              |                      |        | -fl |        | =fl=     | ***             | -=£1 | ***======       | =fl== |        | -fl=: |        | ==f |
| Aroclor-1016 | 5                    | 15     | ប   | 113    | ŧ        | 107             | ł    | 15              | U     | 15     | U     | 15     | U   |
| Aroclor-1221 |                      | 15     | U   | 15     | U        | 15              | U    | 15              | U     | 15     | Ū     | 15     | U   |
| Aroclor-1232 | 2                    | 15     | σ   | 15     | บ        | 15              | ับ   | 15              | Ū     | 15     | Ū     | 15     | -   |
| Aroclor-1242 | 2                    | 15     | U   | 15     | U        | 15              | U    | . 15            | U     | 15     | Ü     | 15     |     |
| Aroclor-1248 | 3                    | 15     | U   | 15     | U        | 15              | ប    | 15              | Ü     | 15     | Ū ·   | 15     |     |
| Aroclor-1254 |                      | 15     | Ū   | 15     | U        | 15              | Ū    | 15              | Ü     | 15     | Ū     | 15     |     |
| Aroclor-1260 | )                    | 2.0    | J   | 103    | ŧ        | 101             | *    | 2.2             | J     | 15     | Ü     | 4.2    | _   |

| <u> </u>           | Cust ID:                                   | J11VJ7                     | ,           | J11VJ8              | )        | PHLKFO                            |          | PBLKFO BS                         |        |         |
|--------------------|--|----------------------------|-------------|---------------------|----------|-----------------------------------|----------|-----------------------------------|--------|---------|
| Sample Information | RFW#:<br>Matrix:<br>D.F.:<br>Units:        | 005<br>SOIL<br>1.0<br>UG/K | 0           | SOIL<br>1.0<br>UG/K | 0        | 06LE0295-M<br>SOIL<br>1.0<br>UG/K | 0        | 06LE0295-M<br>SOIL<br>1.0<br>UG/K | 0      |         |
| Surrogate:         | Tetrachloro-m-xylene<br>Decachlorobiphenyl | 110<br>103                 | *<br>*      | 114<br>107          | \$<br>\$ | 121 *<br>112                      | ŧ        | 122 <b>*</b><br>115               | *      |         |
| Aroclor-1016       |  | 15                         | •=[1==<br>U | 15                  | TI==     |                                   | ∍fl<br>U |                                   | =fl:   |         |
| Aroclor-1221       |  | 15                         | Ū           | 15                  | Ü        | 13                                | U        | 119<br>13                         | ∢<br>U |         |
| Aroclor-1232       |  | 15                         | Ü           | 15                  | Ū        | 13                                | U        | 13                                | U      | 1       |
| Aroclor-1242       |  | 15                         | Ŭ           | 15                  | U        | 13                                | Ū        | 13                                | Ü      | la.K    |
| Aroclor-1248       |  | 15                         | Ū           | 15                  | U        | 13                                | Ū        | 13                                | Ū      | grylack |
| Aroclor-1254       |  | 15                         | Ü           | 15                  | U        | 13                                | Ū        | 13                                | U      | 7       |
| Aroclor-1260       | <u> </u>                                   | 7.0                        | J           | 10                  | J        | 13                                | U        | 105                               | ł      | •       |

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

p 5/29/00

Report Date: 04/25/06 16:13

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Pesticide/PCBs by GC, CLP List

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 1

|   | Cust ID:     | J11VJ3   | J11VJ3  |      | J11VJ3  | 3     | J11VJ4 |          | J11VJ5 |        | J11VJ6  |     |
|---|--------------|----------|---------|------|---------|-------|--------|----------|--------|--------|---------|-----|
| Sample                                  | RFW#:        | 001      | 001 MS  |      | 001 MSD | ,     | 002    |          | 003    |        | 004     |     |
| Information                             | Matrix:      | SOIL     | SOIL    |      | SOIL    |       | SOIL   |          | SOIL   |        | SOIL    |     |
|   | D.F.;        | 4.00     | 4.0     | n    | 4.0     | a a   | 4.0    | Λ        | 4.0    | Λ      | 4.0     | ก   |
|   | Units:       | UG/KG    | UG/K    |      | UG/K    |       | UG/K   |          | UG/K   |        | UG/K    |     |
| Surrogate: Tetrachle                    | oro-m-xylene | 104 %    | 108     | *    | 110     | *     | 108    | *        | 110    | ł      | 116     | *   |
| Decach                                  | lorobiphenyl | 123 * *  | 111     | ł    | 123 *   | · *   | 118    | *        | 130 *  | *      | 121     | Ł   |
| <b>美国李昌安地名西</b> 莱克克                     |              |          |         | -fl- | ******  | =fl== |        | =fl===   |        | =fl=== | 2244282 | ≖fl |
| Alpha-BHC                               |              | 1.5 U    | 98      | *    | 86      | *     | 1.5    | <u>.</u> | 1.5    | Ū      | 0.53    | J   |
| gamma-BHC (Lindane)                     |              | 1.5 U    | 106     | ŧ    | 97      | 8     | 1.5    | ប        | 1.5    | U      | 1.5     | Ü   |
| Beta-BHC                                |              | 2.3 I    | 109     | *    | 99      | 8     | 3.1    |          | 1.5    | U      | 3.9     | -   |
| Heptachlor                              |              | 1.5 U    | 105     | *    | 102     | Ł     | 1.5    | Ū        | 1.5    | บ      | 1.5     | Ū   |
| Heptachlor                              |              | 1.5 U    | 87      | ł    | 80      | ŧ     | 1.5    | Ū        | 1.5    | บ      | 1.5     | Ū   |
| Aldrin                                  |              | 1.5 U    | 98      | ક    | 94      | *     | 0.42   | J        | 1.5    | Ū      | 1.5     | Ü   |
| Heptachlor epoxidegamma-Chlordane       |              | . 1.5 U  | 100.    | *    | . 97    | ક     | 1.5    | U        | 1.5    | U      | 1.5     | บ   |
| gamma-Chlordane                         |              | 0.92 🦅 🔭 | 99      | *    | 96      | *     | 1.1    | J        | 1.5    | U      | 1.5     | U   |
| Endosulfan I                            |              | . 1,5 📆  | . 101   | ¥    | 98      | ¥     | 0.46   | J        | 1.5    | U      | 0.46    | J   |
| Endosulfan Ialpha-Chlordane             |              | 1.2 75   | 105     | *    | . 101   | *     | 1.7    | J .      | 1.5    | U      | 1.5     | Ū   |
| 54,4'-DDB                               |              | 1.5 📆    | 107     | ł    | 108     | *     | 1.5    | J        | 1.5    | U      | 1.4     | J   |
| Dieldrin                                |              | 1.5 0    | 107     | ŧ    | 103     | ¥     | 1.5    | ט        | 1.5    | Ü      | 1.5     | Ū   |
| → Endrin                                |              | 1.5 U    | . 108   | *    | 106     | ŧ     | 1.5    | U        | 1.5    | Ü      | 1.5     | ט   |
| ⇒ Endrin<br>∴ 4,4'-DDD<br>Endosulfan II |              | 1.5 U    | 1.127 * | *    | 124     | * *   | 1.5    | ט        | 1.5    | U      | 1.5     | Ü   |
| Endosulfan II                           |              | 1.5 U    | 106     | ¥    | 103.    | 8     | 1.5    | Ü        | 1.5    | บ      | 1.5     | Ū   |
| 4,4"-DDT                                |              | 3.5 J    | 109     | ¥    | ÷ 112   | *     | 5.2    |          | 1.5    | Ü      | 4.5     | •   |
| Endrin aldehyde                         |              | 1.5 Ū    | 103     | *    | 99      | *     | 1.5    | U        | 1.5    | บ      | 1.5     | U   |
| Endosulfan sulfate                      |              | 1.0 次丁   | 102     | *    | 100     | *     | 1.5    | ט        | 1.5    | ū      | 0.76    | J   |
| Methoxychlor                            |              | 1.5 Ü    | 131     | ¥    | 133     | *     | 1.4    | J        | 1.5    | ū      | 1.5     | Ü   |
| Endrin ketone                           |              | 1.5 ບ    | 112     | *    | 108     | Ł     | 1.5    | Ū        | 1.5    | ū      | 1.5     | Ū   |
| Toxaphene                               |              | 15 UJ    | 15      | Ū    | 15      | U     | 15     | UI       | 15     | Ū.T    | 15      | υJ  |

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

p 5/29/01

Report Date: 04/25/06 16:13

MANUTATION COMPANIES AND STREET

Pesticide/PCBs by GC, CLP List

RFW Batch Number: 0604L712 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 2

|                           | Cust ID:                  | J11VJ7              | J11VJ8  | PBLKFO       | PBLKFO BS      |  |
|---------------------------|---------------------------|---------------------|---------|--------------|----------------|--|
| Sample                    | RPW#:                     | 005                 | 006     | 06LE0295-MB1 | 06LE0295-MB1   | ta.                                    |
| Information               | Matrix:                   | SOIL                | SOIL    | SOIL         | SOIL           |  |
| ·                         | D.F.:                     | 4.00                | 4.00    | 1.00         | 1.00           |  |
|                           | Units:                    | UG/KG               | UG/KG   | UG/KG        | UG/KG          |  |
| Surrogate: To             | etrachloro-m-xylene       | 126 * *             | 152 * % | 102 %        | 94 %           |  |
| _<br>                     | Decachlorobiphenyl        | 116 %               | 120 🕈   | 103 %        |                |  |
| *********                 | ************************* |                     |         |              | 1======f       | l===================================== |
| Alpha-BHC                 |                           | 0.62                | لبم 1.1 | J 0.33 T     | 100 %          |  |
| gamma-BHC (Lin            | dane)                     | 1.5 T               | 0.92    | J = 0.33 $U$ | 99 1           |  |
| Beta-BHC                  |                           | 1.5 V               | 8.5     | J 0.33 t     | 97 🖁           | •                                      |
| Heptachlor                |                           | 1.5 U               | 1.5 U   | 0.33 0       | 101 %          | •                                      |
| Delta-BHC                 |                           | 1.5 U               | 1.5 U   | 0.33 0       | 87 %           | •                                      |
| Aldrin                    |                           | 1.5 U               | 1.5 U   | 0.33         | r 99 <b>1</b>  | •                                      |
| Heptachlor epo            | xide                      | 1.5 U               | 1.5 U   | 0.33 T       | 100 %          | •                                      |
| gamma-Chlordan            | e                         | 1.5 U               | 1.5 U   | 0.33 t       | 7. 98 <b>1</b> |  |
|                           |                           | 0.54 J              | 1.5 U   | 0.33 t       | r. 99 <b>1</b> | •                                      |
| alpha-Chlordan            | e                         | , 1.5 U             | 1.5 U   | 0.33 0       | r 97 <b>1</b>  | •                                      |
| ○ 4,4'-DDE                |                           | 2.1 J               | 1.5 U   | 0.33 t       | 92 9           | ·<br>「                                 |
| O Dieldrin                |                           | 1.5 U               | 1.5 U   | 0.33 t       | 103 %          | ;                                      |
| Endrin Endrin             | •                         | 1.5 U               | 1.5 U   | 0.33 T       | 107 1          |  |
| 4,4'-DDD                  |                           | 1.5 U               | 1.5 U   | 0.33 t       | 92 \$          |  |
| Endosulfan II_            |                           | 1.5 U_              | 1.5 U   |              | J 105 4        | ſ                                      |
| 4,4'-DDT                  |                           | 6.5 J               | 10      | J 0.33 T     | 96 1           | <b>†</b>                               |
| Endrin aldehyd            | e                         | 1.5 ປຸ              | 1.5 U   |              | 7 91 1         | <b>f</b> .                             |
|                           | fate                      | 1.1 75              | 1.5 U   | 0.33 t       | J 98 1         | •                                      |
| Methoxychlor_             |                           | 15 <sup>7</sup> 17. | 1.5 U   | 0.33 [       | J 94 1         | •                                      |
| <pre>Bndrin ketone_</pre> |                           | 0.89                | 1.5 U   |              | J 101 1        | •                                      |
| Toxaphene                 |                           | 15 U J              | 15 U    | J 3.3 U      |                | T ·                                    |

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

pc 5/21/06

July 2016

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

的现在分词,可以可以有一个人的特别的特别的,我们就是有一个人的,我们就是有一个人的。



#### Case Narrative

Client: TNU-HANFORD RC-032

LVL#: 0604L712

SDG/SAF # K0297/RC-032

**W.O.**#: 11343-606-001-9999-00

**Date Received: 04-07-2006** 

### CHLORINATED PESTICIDES

Six (6) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted on 04-17-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-20,24-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

- 1. Samples were extracted and analyzed within required holding time.
- 2. The samples and their associated QC samples received a Copper-Sulfur cleanup according to Lionville Laboratory SOPs based on SW846 method 3660A.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. Five (5) of twenty (20) surrogate recoveries were outside acceptance criteria. However, the surrogate recovery criteria were met (i.e., no more than one outlier per sample).
- 5. All blank spike recoveries were within acceptance criteria.
- 6. Two (2) of forty (40) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 7. All samples required a 4-fold dilution due to the nature of the sample matrix. The reporting limits were adjusted to reflect the necessary dilution.
- 8. The results for soil samples were reported on a dry weight basis.
- 9. The initial calibrations associated with this data set were within acceptance criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 1 pages.



- 10. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
- 11. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 12. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain/Daniels

Lahoratory Manager

Lionville Laboratory Incorporated

som\r:\group\data\pest\tnu hanford\0604-712s.pst

4/27 loc Date

| Lionville Laboratory 5   | ample Discrepancy Report                           | 1 (SDR) SDR #: 0664/33         |
|--|--|--------------------------------|
| Initiator: ///// Date: 4/26/06   | Batch: 06042 7/2—Samples:                          | Parameter: Pasi Matrix: 500    |
| Client:  | Method: swe46/MCAWW/CLP/                           | Prep Batch: 0666-06-16         |
| 1. Reason for SDR 2. COC Discrepancy Tech Profile Transcriptio  b. General Discrepancy Missing Sample/Extract Co | on Error Wrong Test Code ( ontainer Broken Wrong S | Sampler Error on C-O-C Other   |
| Hold Time Exceeded ins<br>Improper Bottle Type No  | sufficient Sample Preserva  Amenable to Analysis   | ation Wrong Received Past Hold |
| Note*: Verified by [Log-in] or [Prep Group] (circ  | cie)signature/date;                                |                                |
| c. Problem (include all relevant specifi   |  |                                |
|  | HIGH FOR 4, 4-000 1                                | J MS + MSb.                    |
| 2. Known or Probable Causes(s)   | •  |                                |
|  |  |                                |
| 3. Discussion and Proposed Action Re-log   | Other Description:                                 |                                |
| Entire Batch<br>Following Samples:   | Ne   | port + narrate                 |
| Re-leach   | ~<br>~~  |                                |
| Re-extract<br>Re-digest  | 11 1   |                                |
| Revise EDD Change Test Code to   |  |                                |
| Place On/Take Off Hold (circle)  | h. 1/  | 1                              |
| Project Manager Instructionssignat     Concur with Proposed Action   | ure/date: 1/2/2                                    | 15/06                          |
| Disagree with Proposed Action; Se  | e Instruction                                      |                                |
| Include in Case Narrative Client Contacted:  |  |                                |
| Date/Person  | ·  |                                |
| Cancel   | -/1  |                                |
| 5. Final Actionsignature/date:   | Other Explan                                       | lation:                        |
| When Final Action has been recorded,   | , forward original to QA Specialist for            | r distribution and filing.     |
| Route Distribution of <u>Completed</u> SDR X Initiator   |  | ion of Completed SDR           |
| X Lab General Manager: M. Tay  | ylor Inorga  | s: Beegle<br>anic: Perrone     |
| X Project Mgr: Stone/Johnson Data Management: Stilwell   |  | C: Kiger<br>Rychlak/Daley      |
| Sample Prep: Beegle/Kiger  |  | n: Perry                       |



### Case Narrative

Client: TNU-HANFORD RC-040

LVL#: 0604L697

SDG/SAF # K0293/RC-040

**W.O.** #: 11343-606-001-9999-00

**Date Received:** 04-06-2006

#### **PCB**

Two (2) solid samples were collected on 04-03-2006.

The samples and their associated QC samples were extracted on 04-16-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 04-24-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

- 1. Samples were extracted and analyzed within required holding time.
- 2. The samples and their associated QC samples received Silica Gel, Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3630C, 3660A and 3665A respectively.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. All surrogate recoveries were within acceptance criteria.
- 5. The blank spike recoveries were within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. The results for solid samples were reported on a dry weight basis.
- 8. The initial calibrations associated with this data set were within acceptance criteria.
- 9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.



- 10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

som\r:\group\data\pest\tnu hanford\0604-697.pcbs

4/24/06 Date

000020

| Washington Closus   | re Hanford                            | \CH  | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST RC-0 |  |                            |              |                       |                               | -032-030          | Page 1      | et 1     |  |   |
|---|---------------------------------------|--|---|--|----------------------------|--------------|-----------------------|-------------------------------|-------------------|-------------|----------|--|---|
| Collector<br>Coffinan                                     |                                       |  | ny Contact<br>Coffman                         | Telephone<br>528-640   |                            |              |                       | Project Coordi<br>KESSNER, JH | nator             | Price Code  | 815      | Data Tu  | iruacounit.   |
| Project Designation<br>100-F Remaining Sites Buria        | l Grounds - Soil Full Protoco         |  | ne Location<br>I-F7 Verification              |  |                            |              |                       | SAF No.<br>RC-032             |                   | Air Quality | ′ 🗆      | <u> 15</u>   | 8760 C  |
| Ice Class No. ERC-96                                      | -030                                  |  | ogbook No.<br>-1174-1                         |  | COA<br>R607F720            | 000          |                       | Method of Shipment Fed Ex     |                   |             |          |  |   |
| Shipped To EBERLINE SERVICES (1)                          | ONVILLE                               | Offsite                                      | Property No.                                  | 700 g  | 500                        | A0603.       | 52                    | Bill of Lading                | Air Bili          | No. 5E      | E 051    | 06   | <u> </u>  |
| POSSIBLE SAMPLE HAZA                                      |                                       |  |   |  |                            | T            | Ţ'                    | \                             | ]                 | <u> </u>    | 1        | 1  | T   |
| NA.   |                                       |  | Preservation None                             |  |                            | Coel 4C      | Cool 4                | C Cool 4C                     | Coal 4            | С           |          |  |   |
| Caralat Handling and for 6                                | See                                   |  | Type of Container                             | 16   | #G                         | aG           | aG                    | aG ·                          | aG                |             | }        | · ·  |   |
| Special Handling and/or S<br>Cool 4 degrees C             | otocage                               | Ī  | No. of Container(s)                           |  |                            |              |                       |                               |                   | 1           |          |  |   |
|   | ÷                                     | 1  | Volume 250g 60ml 60ml 120ml 120ml 125ml       |  |                            |              |                       | u                             |                   | <b>†</b>    |          |  |   |
| · · · · · · · · · · · · · · · · · · ·                     | SAMPLE ANALYS                         |  |   | See item (1) in<br>Special<br>lestructions.  | Chromism<br>Hex - 7196     | PCB4 - 80\$2 | Semi-VC<br>8270A (1   |                               | Pesticide<br>IGR1 |             |          |  |   |
| ·   | · · · · · · · · · · · · · · · · · · · | <u> </u>                                     |   |  |                            |              |                       |                               |                   |             |          |  |   |
| Sample No.  | Matrix *                              | Sample Date                                  | Sample Time                                   |  |                            |              |                       |                               |                   |             | 1 34 36  |  |   |
| J11VJ3  | SOIL                                  | 4/4/06                                       |   | X  | X                          | $\perp X$    | $\perp \chi$          |                               |                   |             |          |  | <u> -7-60</u>                                       |
| J11VJ4  | SOIL                                  |  | 0835  | X  | X                          | 1.           | X                     | X                             |                   | <u> </u>    | <u> </u> | <u> </u>   | F7-62   |
| J11VJ5  | SOIL                                  |  | 0845  | X  | $X_{-}$                    | 1 X          | X                     | $\perp X_{\perp}$             | X                 | -           |          |  | F7-7  |
| J11VJ6  | SOIL                                  |  | 0855  | X  | X                          | <u> </u>     | LX                    | $X_{-}$                       | X                 |             |          |  | F7-8  |
| J11VJ7  | SOIL                                  | 4/4/06                                       | 10905   | LX   | X                          | <u> </u>     | $\perp_{\mathcal{X}}$ | 1 1                           | X                 |             | 1        | <u> </u>   | F7-9  |
| CHAIN OF POSSESSIO  |                                       | Sign/Print                                   |   |  | SPE                        | CIAL INSTR   | UCTIO                 | NS                            |                   |             |          |  | Matrix *  |
| Relinquished By/Removed From 3728#20 46                   | 1/ma 4/4/06  Date/Time -06 /030       | Received By/Ston REFEL F                     | 2C 3728                                       | Date/Time / SCO 4/4/00  (1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Borou, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Polassium, Selenium, Silicon, Silver, Sodium, Varadium, Zinc); Mercury - 7470 - (CV) |                            |              |                       |                               |                   |             | odenum.  | SeSoil<br>SE-Subman<br>SD-Saled<br>SI-Shelge<br>W = Walts<br>O-Oil |   |
| Relinquished By/Removed From Relinquished By/Removed From | Date/Time                             | Received By/Ston FEO 6 Received By/Ston      | -din D  | ate/Time   |                            |              |                       |                               |                   |             |          |  | A=A#<br>OS=Draw Soints<br>OL=Dram Lagad<br>T=Tisag: |
| Relinquished By/Removed From                              | 7.06 / 0920<br>Date/Time              | Received By/Stor                             | Mith 45 din D                                 | 7.04 / 0<br>ate/Time   | Personnel not available to |              |                       |                               |                   |             |          | V=Wipt<br>V=Veletation<br>X=Other                                  |   |
| Relinquished By/Removed From                              | Dute/Time                             | Received By/Stor                             | med (m D                                      | Date/Time Relinquish samples from 3728  Ref # Con 416 106  |                            |              |                       |                               |                   |             |          |  |   |
| LABORATORY Received E<br>SECTION                          | Эу                                    | <u>.                                    </u> | <del>`</del>                                  | Titl   | <br>k                      |              | ·                     | <del></del>                   | <del></del>       |             |          | Date/Time  |   |
| FINAL SAMPLE Disposal M                                   | fethod                                | · · · · · · · · · · · · · · · · · · ·        | <del></del>                                   |  |                            | Disp         | sed By                |                               |                   |             |          | Date/Time  |   |

| Washington Closu  | re Hanford   | C   | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |   |                        |                                  |                      |   | RO              | C-032-030       | Page 1                  | 0( )   |  |
|---|--|---|--|---|------------------------|----------------------------------|----------------------|---|-----------------|-----------------|-------------------------|--|--|
| Collector<br>Coffman  |  | Сова                                      | nny Contact<br>. Coffman                 | Telephon<br>528-64                          | ie No.                 |                                  |                      | Project Coordi<br>KESSNER, JH                                       |                 | Price Code      | 81                      | Data Tu  | ั้<br>บุ้มมอาสสาร  |
| Project Designation<br>100-F Remaining Sites Bur              | ial Grounds - Soil Full Pro                            |   | ling Location<br>17-F7 Verification      |   |                        |                                  |                      | SAF No.<br>RC-032   |                 | Air Qualit      | : <b>у</b> 🗆            | 15   | DAYE   |
| Ice Chest No. ERC-9   | 6-030  |   | Legbook No.<br>Lei 174-i                 |   | COA<br>R607F720        | 00                               |                      | Method of Ship<br>Fed Ex  | ment            |                 |                         |  | 2<br>2<br>2  |
| Shipped To<br>EBERLINE SERVICES (1                            |  | Offsit                                    | te Property No.                          | 0603  | 352                    |                                  |                      | Bill of Lading/   | Air Bill        | No. SEA         | E 051                   | 00   |  |
| POSSIBLE SAMPLE HAZ   | ARDS/REMARKS   |   |  |   |                        |                                  | 1                    |   |                 |                 |                         | 1.   | 1  |
| NA .  |  |   | Preservation                             | None  | Cool 4C                | Cool 4C                          | Coal 40              |   | Cool            |                 |                         |  | <u></u>  |
| Special Handling and/or                                       | Storage  |   | Type of Container                        | aG  | #G                     | #G                               | aG                   | aG .  | a.G             |                 |                         | <del>                                     </del> | <del> </del>   |
| Coal 4 degrees C  | •  | •   | No. of Container(s)                      | 1   | '                      | <u> </u>                         |                      | 1   |                 |                 |                         | ļ  |  |
|   |  |   | Volume                                   | 250g  | 60miL                  | 60mL                             | 120ml                | L 120mL   | 125a            | ni.             |                         | Ì  |  |
|   | SAMPLE ANAL  | YSIS                                      |  | See item (1) is<br>Special<br>Instructions, | Chromium<br>Hea + 7194 | PCBs - 8082                      | Scmi-VO.<br>8270A (T |   | Pesticid<br>801 |                 |                         |  |  |
|   |  |   |  |   |                        | Ŀ                                |                      |   |                 |                 |                         |  |  |
| Sample No.  | . Matrix *   | Sample Date                               | Sample Time                              |   |                        |                                  |                      |   |                 |                 |                         |  |  |
| J11VJ8  | SOIL   | 4/4/06                                    | 0915                                     | X   | X                      | X                                | X                    | Λ   | X               |                 |                         |  | F7-10  |
|   |  | · ·                                       |  |   |                        |                                  |                      |   |                 | _               | <del>- </del> -         | <del> </del>                                     | <u> </u>   |
|   |  |   |  |   |                        |                                  |                      |   |                 |                 |                         | <u> </u>   |  |
| CILLIN OF POSSIBLE  |  |   |  | <u> </u>                                    | <u> </u>               |                                  |                      |   |                 |                 |                         |  |  |
| CHAIN OF POSSESS Relinquished By/Removed From.                | Dete/Time /500   | Sign/Prin                                 |  | ate/Time /                                  |                        | CIAL INSTI                       | WCTIO                | NS  |                 |                 | •                       |  | Matrix *   |
| RTCOFFINAL PT CA<br>Relinquished By Removed From<br>3739 #2 C | fma 4/9/06  Date/Time 6-06 /030  W C# Date/Time        | REFER<br>Resciped By/St<br>Received By/St | ind in 19728 Disposed in 19728           | 4/4/04<br>Pale/Time                         | Cadn<br>Nick           | nium, Calcium,                   | Chromium             | List) (Akuninum, 1<br>n, Cobalt, Copper, 1<br>Silicon, Silver, Sodi | Iron, Lesc      | d, Magnesium, M | langairese, Molyl       | bdenum,  | S=Naid SE=Satisparsa SO=Solul SI=Shadp: W = Water O=Oil A=Aar OS=Drung Sikid |
| Relinguished By/Removed From                                  | n. <u>4-6-06 / 1570</u><br>Date/Tithe<br>.7-06 / 09-20 | Section 1 Page                            | archita                                  | tate/Time<br>f- 7-0()                       | 10920                  |                                  |                      |   |                 |                 |                         |  | DC+Oram Liga<br>T=Tissue<br>Wi+Ware<br>L+Capital                             |
| Reliaquished By/Removed From                                  | Date/Time  | Received By/Sa                            |  | Jale/Time                                   | <del></del>            |                                  |                      |   |                 |                 | V=Vegetilles<br>X=Ophes |  |  |
| Relinquisted By/Removed From                                  | Dale/Time  | Received By/Se                            | ored in C                                | late/Time                                   | reli<br>Ref            | inquish samp<br># <u>ZC</u> on 4 | les from             | 26e   |                 |                 |                         |  |  |
| LABORATORY Received SECTION                                   | Ву   | <del> </del>                              | ·  | Ti  | ile                    | <del></del>                      |                      |   | _ <del></del>   |                 |                         | Date/Time  | _ <u></u>  |
| FINAL SAMPLE Disposal DISPOSITION                             | Method   | <del></del>                               |  |   |                        | Disp                             | osed By              | <u> </u>  |                 |                 | <u> </u>                | Date/Fine  | · · · · · · · · · · · · · · · · · · ·  |

# Appendix 5

**Data Validation Supporting Documentation** 

### PCB DATA VALIDATION CHECKLIST

| VALIDATION<br>LEVEL:            | A                     | В            |                       | D            | E      |                                       |
|---------------------------------|-----------------------|--------------|-----------------------|--------------|--------|---------------------------------------|
| PROJECT: (                      | .07-F-7               |              | DATA PACKAG           | E: Koza      | 7      |                                       |
| VALIDATOR:                      | TLI                   | LAB: LL      |                       | DATE: 5/2    | 1/00   |                                       |
|                                 |                       |              | SDG: Ko               | 1297         |        |                                       |
|                                 |                       | ANALYSES     | PERFORMED             |              |        |                                       |
| SW-846 8081                     | SW-846 8081<br>(TCLP) | SW-846 8082  | SW-846 8081<br>(TCLP) |              |        |                                       |
| SAMPLES/MATE                    | ХIX                   |              |                       |              |        |                                       |
| JIIVJ3<br>STVVIC                | J11VJ                 | IIC YI       | VJ5                   | てっていけ        | 1117   |                                       |
| DATA PA  Technical verification |                       |              | CASE NARRATIV         |              | 55.1   | N/A                                   |
| Comments:                       |                       |              |                       |              |        | · · · · · · · · · · · · · · · · · · · |
| 2. INSTRUM                      | IENT PERFORM          | ANCE AND CAL | IBRATIONS (Lev        | els D and E) | 1      | 10                                    |
| Initial calibrations a          | -                     |              |                       |              | i      |                                       |
| Continuing calibrati            | •                     |              |                       |              | 1      |                                       |
| Standards traceable             |                       |              |                       |              |        |                                       |
| Standards expired?.             |                       |              |                       |              |        |                                       |
| Calculation check a             | -                     |              |                       |              |        | 1                                     |
| DDT and endrin bre              | _                     |              |                       |              | Yes No | N/A                                   |
| Comments:                       | <del>,</del> -        | <del></del>  |                       |              |        |                                       |

· 中国的 电基本 医中枢 经国际基本的 2004年 1804年 18

### PCB DATA VALIDATION CHECKLIST

| 3. BLANKS (Levels B, C, D, and E)  |             |
|--|-------------|
| Calibration blanks analyzed? (Levels D, E)   | Yes No NA   |
| Calibration blank results acceptable? (Levels D, E)                                | Yes No N/A  |
| Laboratory blanks analyzed?  | Yes No N/A  |
| Laboratory blank results acceptable?   | Yes No N/A  |
| Field/trip blanks analyzed? (Levels C, D, E)                                       | Yes No N/A  |
| Field/trip blank results acceptable? (Levels C, D, E)                              | Yes No N/A  |
| Transcription/calculation errors? (Levels D, E)                                    | Yes No 🕡    |
| Comments:  | no FB       |
|  |             |
|  |             |
|  |             |
| 4. ACCURACY (Levels C, D, and E)   |             |
| Surrogates analyzed?   | Ye No N/A   |
| Surrogate recoveries acceptable?   | Yes (No N/A |
| Surrogates traceable? (Levels D, E)  |             |
| Surrogates expired? (Levels D, E)  | Yes No 🕡    |
| MS/MSD samples analyzed?   |             |
| MS/MSD results acceptable?   |             |
| MS/MSD standards NIST traceable? (Levels D, E)                                     | Yes No 🔊    |
| MS/MSD standards expired? (Levels D, E)  | Yes No (N/) |
| LCS/BSS samples analyzed?  | No N/A      |
| LCS/BSS results acceptable?  |             |
| Standards traceable? (Levels D, E)   | Yes No 🕪    |
| Standards expired? (Levels D, E)   | Yes No (N/A |
| Transcription/calculation errors? (Levels D, E)                                    |             |
| Performance audit sample(s) analyzed?  | Yes/No N/A  |
| Performance audit sample results acceptable?                                       | ( ) / / - ` |
| Performance audit sample results acceptable?  Comments: pest J delet in J3 I7 + J8 |             |
|  |             |
| no Josephne Ms/MSD or LCS  |             |

### PCB DATA VALIDATION CHECKLIST

| 5. PRECISION (Levels C, D, and E)               |                 |
|---|-----------------|
| Duplicate RPD values acceptable?                | Yes No N/A      |
| Duplicate results acceptable?                   | Yes No N/A      |
| MS/MSD standards NIST traceable? (Levels D, E)  | Yes No N/A      |
| MS/MSD standards expired? (Levels D, E)         | Yes No NA       |
| Field duplicate RPD values acceptable?          | Yes No N/A      |
| Field split RPD values acceptable?              | Yes No NA       |
| Transcription/calculation errors? (Levels D, E) | Yes No (N/A)    |
| Comments:                                       |                 |
|   |                 |
|   |                 |
|   |                 |
| no toxaphere us/usD - I all                     |                 |
|   |                 |
| 6. SYSTEM PERFORMANCE (Levels D and E)          |                 |
| Chromatographic performance acceptable?         | f i             |
| Positive results resolved acceptably?           | Yes No N/A      |
| Comments:                                       |                 |
|   |                 |
|   |                 |
|   |                 |
|   |                 |
| 7. HOLDING TIMES (all levels)                   | $\wedge \wedge$ |
| Samples properly preserved?                     | Yes No N/A      |
| Sample holding times acceptable?                | i i             |
| Comments:                                       |                 |
|   |                 |
|   |                 |
|   |                 |
|   |                 |

### PCB DATA VALIDATION CHECKLIST

| LIECTION LIMITS (an  |
|--|
|  |
| Yes No N/A   |
| Yes No WA  |
| Yes) No N/A  |
| Yes No N/A   |
| Yes No M/A   |
| Yes (No) N/A   |
| Yes No (N/A  |
| Yes No (1/A  |
|  |
|  |
| W. A. C.   |
| LIVE AND THE STATE OF THE STATE |
|  |
|  |
| Yes No (N/A  |
| Yes No N/A   |
| Yes No N/  |
| <u> </u>   |
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Date:

2 June 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-F Remaining Sites Burial Grounds - Soil Full Protocol - Waste

Sites 1607-F-7

Subject: Inorganics - Data Package No. K0297-LLI

### INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| 1 Samile 164 | ASAMAPAH DARAM | apadri Villa da | Validation | Date       |
|--------------|----------------|---|------------|------------|
| J11VJ3       | 4/4/06         | Soil  | С          | See note 1 |
| J11VJ4       | 4/4/06         | Soil  | С          | See note 1 |
| J11VJ5       | 4/4/06         | Soil  | С          | See note 1 |
| J11VJ6       | 4/4/06         | Soil  | С          | See note 1 |
| J11VJ7       | 4/4/06         | Soil  | С          | See note 1 |
| J11VJ8       | 4/4/06         | Soil  | С          | See note 1 |

<sup>1 -</sup> ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

### DATA QUALITY PARAMETERS

#### Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

### · Preparation (Method) Blanks

### Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

### Field (Equipment) Blank

No field blanks were submitted for analysis.

#### Accuracy

### Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (45.1%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (54.8%), all silicon results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### Precision

### Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

### Field Duplicate

One set of field duplicates (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are assessed using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

### Completeness

Data package No. K0297 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

### **MAJOR DEFICIENCIES**

None found.

### MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to a matrix spike recovery outside QC limits (45.1%), all antimony results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (54.8%), all silicon results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### **REFERENCES**

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

# Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

  The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

### METALS DATA QUALIFICATION SUMMARY\*

| SDG: KC29%11 T. T. REVIEWERN PROPER TECT. TECT. F.7. PAGE_1_OF_1 |           |                  |              |  |  |  |  |
|--|-----------|------------------|--------------|--|--|--|--|
| COMMENTS:  |           |                  |              |  |  |  |  |
| COMPOUND   | QUALIFIER | SAMPLES AFFECTED | REASON       |  |  |  |  |
| Antimony   | J         | All              | MS recovery  |  |  |  |  |
| Silicon  | J         | All              | LCS recovery |  |  |  |  |

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

# Appendix 3

**Qualified Data Summary and Annotated Laboratory Reports** 

| Project: WASI | INGT | ON CLOS | SUR      | E HANFO   | ORD | )      |     | 1      |   |        |    |        |   |
|---------------|------|---------|----------|-----------|-----|--------|-----|--------|---|--------|----|--------|---|
| Lab: LLI      | SDG: | K0297   |          |           |     |        |     |        |   |        |    |        |   |
| Sample Number | 51   | J11VJ3  |          | J11VJ4    |     | J11VJ5 |     | J11VJ6 |   | J11VJ7 |    | J11VJ8 |   |
| Remarks       |      |         |          | Duplicate |     |        |     |        |   |        |    |        |   |
| Sample Date   |      | 4/4/06  |          | 4/4/06    |     | 4/4/06 |     | 4/4/06 |   | 4/4/06 |    | 4/4/06 |   |
| Inorganics    | RQL  | Result  | Q        | Result    |     | Result | ø   | Result | ø | Result | a  | Result | a |
| Silver        | 0.2  | 0.08    | U        | 0.08      | ٦   | 0.08   | ט ( | 0.08   | U | 0.08   | ש  | 0.08   | U |
| Aluminum      |      | 4830    |          | 5210      |     | 6470   |     | 3680   |   | 4970   |    | 5640   |   |
| Arsenic       | 10   | 2.3     |          | 2.5       |     | 2.4    |     | 1.9    |   | 2.5    |    | 3.7    |   |
| Boron         |      | 1.5     |          | 2.3       |     | 3.4    |     | 2.5    |   | 3.6    |    | 4.7    |   |
| Barium        | 2    | 85.6    |          | 85.1      |     | 100    |     | 68.5   |   | 105    |    | 135    |   |
| Beryllium     |      | 0.32    |          | 0.36      |     | 0.44   |     | 0.27   |   | 0.36   |    | 0.41   |   |
| Calcium       |      | 3440    |          | 3710      |     | 3380   |     | 3490   |   | 4520   |    | 5360   |   |
| Cadmium       | 0.2  | 0.16    |          | 0.18      |     | 0.16   |     | 0.14   |   | 0.22   |    | 0.32   |   |
| Cobalt        |      | 5.1     |          | 5.5       |     | 6.5    |     | 3.8    |   | 4.9    |    | 5.5    |   |
| Chromium      | 1    | 7.9     |          | 8.6       |     | 9.5    |     | 7.2    |   | 8.3    |    | 18.7   |   |
| Copper        |      | 12.5    |          | 14.3      |     | 11.4   |     | 10.4   |   | 13.3   |    | 15.3   |   |
| Iron          |      | 11800   |          | 13300     |     | 16000  |     | 9200   |   | 11900  |    | 12500  |   |
| Mercury       | 0.2  | 0.02    |          | 0.02      | U   | 0.02   | υ   | 0.02   | υ | 0.02   |    | 0.02   |   |
| Potassium     |      | 949     |          | 1010      |     | 1480   |     | 719    |   | 1050   |    | 1200   |   |
| Magnesium     |      | 3080    |          | 3290      |     | 3780   |     | 2670   |   | 3260   |    | 3420   |   |
| Manganese     |      | 253     |          | 269       |     | 321    |     | 183    |   | 233    |    | 276    |   |
| Molybdenum    |      | 0.51    |          | 0.52      |     | 0.48   |     | 0.45   |   | 0.52   |    | 0.50   |   |
| Sodium        |      | 89.5    |          | 95.5      |     | 150    | L   | 89.5   | _ | 116    |    | 126    | _ |
| Nickel        |      | 9.1     |          | 9.9       |     | 10.0   |     | 8.3    |   | 9.1    |    | 9.5    |   |
| Lead          | 5    |         |          | 6.0       |     | 4.7    |     | 46.3   |   | 7.8    |    | 28.2   |   |
| Antimony      |      | 0.49    |          |           |     |        |     | 0.48   |   |        |    |        |   |
| Selenium      | 1    |         |          | 0.52      |     | 0.52   |     | 0.51   |   | 0.51   |    | 0.52   | 1 |
| Silicon       |      | 456     | <u> </u> | 518       |     | 606    | -   | 475    | J | 490    | J  | 450    | - |
| Vanadium      |      | 25.5    |          | 30.1      |     | 36.8   |     | 21.1   |   | 27.4   | L_ | 27.2   | - |
| Zinc          | 1    | 36.0    |          | 38.5      | 1   | 38.9   |     | 35.9   |   | 46.8   | ļ. | 84.0   |   |

## INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0604L712

|        |                   |  | .*            |        | reporting | DILUTION |
|--------|-------------------|--|---------------|--------|-----------|----------|
| SANPLE | SITE ID           | ANALYTE                                      | RESULT        | UNITS  | LIMIT     | FACTOR   |
|        | 22229422222222222 | # 48622# *********************************** | *****         |        |           | ****     |
| -001   | J11VJ3            | Silver, Total                                | 0.08 1        | MG/KG  | 0.08      | 1.0      |
|        |                   | Aluminum, Total                              | 4830          | MG/KG  | 3.2       | 1.0      |
|        | •                 | Arsenic, Total                               | 2.3           | MG/KG  | 0.68      | 1.0      |
|        |                   | Boron, Total                                 | 1.5           | MG/KG  | 0.27      | 1.0      |
|        |                   | Barium, Total                                | 85.6          | NG/KG  | 0.02      | 1.0      |
|        |                   | Beryllium, Total                             | 0.32          | MG/KG  | D.02      | 1.0      |
|        |                   | Calcium, Total                               | 3440          | MG/KG  | 1.8       | 1.0      |
|        | •                 | Cadmium, Total                               | 0.16          | MG/KG  | 0.08      | 1.6      |
|        |                   | Cobalt, Total                                | 5.1           | NG/KG  | 0.16      | 1.0      |
|        | •                 | Chromium, Total                              | 7.9           | NG/KG  | 0.14      | 1.0      |
|        |                   | Copper, Total                                | 12.5          | MG/KG  | 0.13      | 1.0      |
|        |                   | Iron, Total                                  | 11800         | MG/KG  | 3.9       | 1.0      |
|        |                   | Mercury, Total                               | 0.02          | MG/KG  | 0.02      | 1.0      |
|        |                   | Potassium, Total                             | 949           | MG/KG  | 2.5       | 1.0      |
|        |                   | Magnesium, Total                             | 3080          | NG/KG  | 1.1       | 1.0      |
|        |                   | Mangamese, Total                             | 253           | MG/KG  | 0.03      | 1.0      |
|        | ·                 | Molybdenum, Total                            | 0.51          | MG/KG  | 0.32      | 1.0      |
|        |                   | Sodium, Total                                | 89.5          | MG/KG  | 0.84      | 1.0      |
|        |                   | Nickel, Total                                | 9.1           | MG/KG  | 0.27      | 1.0      |
|        | •                 | Lead, Total                                  | 6.2           | MG/KG  | 0.34      | 1.0      |
|        |                   | Antimony, Total                              | 0.49 น (      | ING/KG | 0.49      | 1.0      |
|        |                   | Selenium, Total                              | 0,52 <u>u</u> | MG/KG  | 0.52      | 1.0      |
|        |                   | Silicon, Total                               | 456 J         | MG/KG  | 2.5       | 1.0      |
|        |                   | Vanadium, Total                              | 25.5          | MG/KG  | 0.1       | 1.0      |
|        | · ·               |  |               |        |           |          |

Zinc, Total

12/21/0L

MG/KG

1.D

## INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0604L712

| •      |         |  |         |       | REPORTING | DILUTION |
|--------|---------|--|---------|-------|-----------|----------|
| SAMPLE | SITE ID | ANALYTE  | RESULT  | UNITS | LIMIT     | FACTOR   |
| *****  |         | 医伊尔里氏 医皮肤 化二甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基 | ******  | ***** |           | *****    |
| -002   | J11VJ4  | Silver, Total                                      | 0.08 u  | MG/KG | 0.08      | 1.0      |
|        |         | Aluminum, Total                                    | 5210    | MG/KG | 3.2       | 1.0      |
|        |         | Arsenic, Total                                     | 2.5     | MG/KG | 0.67      | 1.0      |
|        |         | Boron, Total                                       | 2.3     | NG/KG | 0.26      | 1.0      |
|        |         | Barium, Total                                      | 85.1    | MG/KG | 0.02      | 1.0      |
|        | •       | Beryllium, Total                                   | 0.36    | MG/KG | 0.02      | 1.D      |
|        | •       | Calcium, Total                                     | 3710    | MG/KG | 1.8       | 1.0      |
|        |         | Cadmium, Total                                     | 0.18    | NG/KG | 0.08      | 1.0      |
|        |         | Cobalt, Total                                      | 5.5     | MG/KG | 0.15      | 1.0      |
|        |         | Chromium, Total                                    | 8.6     | MG/KG | 0.14      | 1.0      |
|        | •       | Copper, Total                                      | 14.3    | MG/KG | 0.13      | 1.0      |
|        |         | Iron, Total  | 13300   | mg/kg | 3.8       | 1.0      |
|        |         | Mercury, Total                                     | 0.02 u  | MG/KG | 0.02      | 1.0      |
|        |         | Potassium, Total                                   | 1010    | NG/KG | 2.5       | 1.0      |
|        |         | Magnesium, Total                                   | 3290    | MG/KG | 1.1       | 1.0      |
|        |         | Manganese, Total                                   | 269     | MG/KG | 0.03      | 1.0      |
|        |         | Holybdenum, Total                                  | 0.52    | ng/kg | 0.32      | 1.0      |
|        |         | Sodium, Total                                      | 95.5    | ng/kg | 0.83      | 1.6      |
|        |         | Nickel, Total                                      | 9.9     | MG/KG | 0.26      | 1.0      |
|        |         | Lead, Total  | 6.0     | MG/KG | 0.34      | 1.0      |
|        |         | Antimony, Total                                    | 0.48 u. | MG/KG | 0.48      | 1.0      |
|        |         | Selenium, Total                                    | 0.52 u  | MG/KG | 0.52      | 1.0      |
|        |         | Silicon, Total                                     | 518 J   | HG/KG | 2.5       | 1.0      |
|        | •       | Vanadium, Total                                    | 30.1    | MG/KG | 0.1       | 1.0      |
| ·      |         | Zine, Total  | 30.5    | NG/KG | 0.12      | 1.0      |

M29/0

#### INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0604L712

|        |         |                   |        |        | REPORTING | DILUTION |
|--------|---------|-------------------|--------|--------|-----------|----------|
| Sample | SITE ID | ANALYTE           | RESULT | uni ts | LINIT     | PACTOR   |
| ====== |         |                   |        |        | ********  | ****     |
| -003   | J11VJ5  | Silver, Total     | 0.08 u | NG/KG  | 0.08      | 1.0      |
|        |         | Aluminum, Total   | 6470   | MG/KG  | 3.2       | 1.6      |
|        |         | Arsenic, Total    | 2.4    | MG/KG  | 0.67      | 1.0      |
|        |         | Boron, Total      | 3.4    | MG/KG  | 0.26      | 1.0      |
| •      |         | Barium, Total     | 100    | MG/KG  | 0.02      | 1.0      |
|        |         | Beryllium, Total  | 0.44   | MG/KG  | 0.02      | 1.0      |
|        |         | Calcium, Total    | 3320   | MG/KG  | 1.8       | 1.0      |
|        |         | Cadmium, Total    | 0.16   | MG/KG  | 0.08      | 1.0      |
|        |         | Cobalt, Total     | 6.5    | MG/KG  | 0.15      | 1.0      |
|        |         | Chromium, Total   | 9.5    | NG/KG  | 0.14      | 1.0      |
|        |         | Copper, Total     | 11.4   | MG/KG  | 0.13      | 1.0      |
|        |         | Iron, Total       | 16000  | MG/KG  | 3.9       | 1.0      |
|        | •       | Mercury, Total    | 0.02 u | MG/KG  | 0.02      | 1.0      |
|        |         | Potassium, Total  | 1480   | MG/KG  | 2.5       | 1.0      |
|        |         | Magnesium, Total  | 3780   | MG/KG  | 1.1       | 1.0      |
|        |         | Manganese, Total  | 321    | MG/KG  | 0.03      | 1.0      |
|        |         | Molybdenum, Total | 0.48   | ng/kg  | 0.32      | 1.0      |
|        |         | Sodium, Total     | 150    | MG/KG  | 0.84      | 1.0      |
|        |         | Nickel, Total     | 10.0   | MG/KG  | 0.26      | 1.0      |
|        |         | Lead, Total       | 4.7    | NG/KG  | 0.34      | 1.0      |
| •      |         | Antimony, Total   | 0.53   | NG/KG  | 0.49      | 1.0      |
|        |         | Selenium, Total   | 0.52 u | MG/KG  | 0.52      | 1.0      |
|        |         | Silicon, Total    | 606 J  | MG/KG  | 2.5       | 1.0      |
|        |         | Vanadium, Total   | 36.8   | MG/KG  | 0.1       | 1.0      |
|        |         | Zinc, Total       | 38.9   | MG/KG  | 0.18      | 1.0      |

5/29/04

#### INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297

| WORK | ORDER: | 11343-606-001-9999-00 |
|------|--------|-----------------------|

|        |         |  |             |        | REPORTING | DILUTION |
|--------|---------|--|-------------|--------|-----------|----------|
| SAMPLE | SITE ID | ANALYTE  | RESULT      | UNITS  | LIMIT     | FACTOR   |
| ****   |         | <b>建设设计划 医克里克斯氏 化二甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基</b> | ###EE226    | 282862 | *======   | *****    |
| -004   | J11VJ6  | Silver, Total  | 0.08 u      | MG/KG  | 0.98      | 1.0      |
|        |         | Aluminum, Total  | 3680 .      | MG/KG  | 3.1       | 1.0      |
| -      |         | Arsenic, Total   | 1.9         | MG/KG  | 0.67      | 1.0      |
|        |         | Boron, Total   | 2.5         | MG/KG  | 0.26      | 1.0      |
|        |         | Barium, Total  | 68.6        | MG/KG  | 0.02      | 1.0      |
|        | •       | Beryllium, Total   | 0.27        | NG/KG  | 0.02      | 1.0      |
|        | •       | Calcium, Total   | 3490        | MG/KG  | 1.8       | 1.0      |
|        |         | Cadmium, Total   | 0.14        | MG/KG  | 0.08      | 1.0      |
|        |         | Cobalt, Total  | 3.8         | NG/KG  | 0.15      | 1.0      |
|        | •       | Chromium, Total  | 7.2         | ng/kg  | 0.14      | 1.0      |
|        |         | Copper, Total  | 10.4        | MG/KG  | 0.13      | 1.0      |
|        |         | Iron, Total  | 9200        | NG/KG  | 3.8       | 1.0      |
|        | 4       | Mercury, Total   | 0.02 u      | MG/KG  | 0.02      | 1.0      |
|        |         | Potassium, Total   | 71 <b>9</b> | MG/KG  | 2.5       | 1.0      |
|        |         | Magnesium, Total   | 2670        | MG/KG  | 1.1       | 1.0      |
|        |         | Manganese, Total   | 183         | MG/KG  | 6.03      | 1.0      |
|        |         | Molybdenum, Total  | 0.45        | MG/KG  | 0.32      | 1.0      |
|        |         | Bodium, Total  | 89.5        | MG/KG  | 0.83      | 1.0      |
|        |         | Nickel, Total  | 8.3         | MG/KG  | 0.26      | 1.0      |
|        |         | Lead, Total  | 46.3        | MG/KG  | 0.34      | 1.0      |
|        |         | Antimony, Total  | 0.48 u      | MG/KG  | 0.48      | 1.0      |
|        | ·       | Selenium, Total  |             | MG/KG  | 0.51      | 1.0      |
|        |         | Silicon, Total   | 475 J       | MG/KG  | 2.5       | 1.0      |
|        | •       | Vanadium, Total  | 21.1        | MG/KG  | 0.1       | 1.0      |
|        |         | Zinc. Total  | 35.9        | MG/KG  | 0.17      | 1.0      |

#### INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 9604L712

|        | •              | •                 |        |       | REPORTING | DILUTION |
|--------|----------------|-------------------|--------|-------|-----------|----------|
| Sample | SITE ID        | ANALYTE           | result | etinu | LIMIT     | FACTOR   |
| ###### | ************** |                   | *****  |       | =======   |          |
| -005   | J11VJ7         | Silver, Total     | 0.08 u | MG/KĠ | 0.08      | 1.0      |
| -      | •              | Aluminum, Total   | 4970   | MG/KG | 3.1       | 1.0      |
|        | •              | Arsenic, Total    | 2.5    | MG/KG | 0.66      | 1.0      |
|        |                | Boron, Total      | 3.6    | MG/KG | 0.26      | 1.0      |
|        | •              | Barium, Total     | 105    | MG/KG | 0.02      | 1.0      |
|        |                | Beryllium, Total  | 0.36   | MG/KG | 0.02      | 1.0      |
|        | •              | Calcium, Total    | 4520   | MG/KG | 1.8       | 1.0      |
|        |                | Cadmium, Total    | 0.22   | MG/KG | 0.08      | 1.0      |
|        | •              | Cobalt, Total     | 4.9    | MG/KG | 0.15      | 1.0      |
|        | •              | Chromium, Total   | 8.3    | MG/KG | 0.14      | 1.0      |
|        |                | Copper, Total     | 13.3   | NG/KG | 0.13      | 1.0      |
|        |                | Iron, Total       | 11900  | MG/KG | 3.8       | 1.0      |
|        |                | Mercury, Total    | 0.02   | MG/KG | 0.02      | 1.0      |
|        |                | Potassium, Total  | 1050   | MG/KG | 2.5       | 1.0      |
|        | •              | Magnesium, Total  | 3260   | MG/KG | 1.1       | 1.0      |
|        |                | Manganese, Total  | 233    | MG/KG | 0.03      | 1.0      |
|        | •              | Molybdenum, Total | 0.52   | MG/KG | 0.32      | 1.0      |
|        | ·              | Sodium, Total     | 116    | MG/KG | 0.83      | 1.0      |
|        |                | Nickel, Total     | 9.1    | NG/KG | 0.26      | 1.0      |
|        | •              | Lead, Total       | 7.8    | NG/KG | 0.34      | 1.0      |
|        |                | Antimony, Total   | 0.48 u | MG/KG | 0.48      | 1.0      |
|        |                | Selenium, Total   | 0.51 y | MG/KG | 0.51      | 1.0      |
|        | • •            | Silicon, Total    | 490 🔏  | MG/KG | 2.5       | 1.0      |
|        | :              | Vanadium, Total   | 27.4   | MG/KG | 0.1       | 1.0      |
|        |                | Zinc, Total       | 46.8   | MG/KG | 0.17      | 1.0      |

× 1/27/06

## INORGANICS DATA SUMMARY REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0604L712

|        | •                     |                   |             |        | REPORTING | DILUTION         |
|--------|-----------------------|-------------------|-------------|--------|-----------|------------------|
| SANPLE | SITE ID               | ANALYTE           | RESULT      | UNITS  | LIMIT     | FACTOR           |
| ****   | EZ==35EC7X78EF####### | **-               |             | @E@EEE | *****     | -22 <b>322</b> 6 |
| -006   | J11 <b>VJ8</b>        | Silver, Total     | 0.08 u      | MG/KG  | 0.08      | 1.0              |
|        |                       | Aluminum, Total   | 5640        | MG/KG  | 3.2       | 1.0              |
|        |                       | Arsenic, Total    | 3.7         | MG/KG  | 0.67      | 1.0              |
|        |                       | Boron, Total      | 4.7         | MG/KG  | 0.26      | 1.0              |
|        |                       | Barium, Total     | 135         | MG/KG  | 0.02      | 1.0              |
|        | •                     | Beryllium, Total  | 0.41        | MG/KG  | 0.02      | 1.0              |
|        |                       | Calcium, Total    | 5360        | MG/KG  | 1.8       | 1.0              |
|        |                       | Cadmium, Total    | 0.32        | MG/KG  | 0.08      | 1.0              |
|        |                       | Cobalt, Total     | <b>5. 5</b> | MG/KG  | 0.15      | 1.0              |
|        |                       | Chromium, Total   | 18.7        | MG/KG  | 0.14      | 1.0              |
|        | •                     | Copper, Total     | 15.3        | MG/KG  | 0.13      | 1.0              |
|        |                       | Iron, Total       | 12500       | MG/KG  | 3.8       | 1.0              |
|        |                       | Mercury, Total    | 0.02        | MG/KG  | 0.02      | 1.0              |
|        |                       | Potassium, Total  | 1200        | MG/KG  | 2.5       | 1.0              |
|        |                       | Nagnesium, Total  | 3420        | MG/KG  | 1.1       | 1.0              |
|        |                       | Manganese, Total  | 276         | MG/KG  | 0.03      | 1.0              |
|        |                       | Molybdenum, Total | 0.50        | MG/KG  | 0.32      | 1.0              |
|        |                       | Sodium, Total     | 126         | MG/KG  | 0.84      | 1.0              |
|        |                       | Nickel, Total     | 9.5         | MG/KG  | 0.26      | 1.0              |
|        | •                     | Lead, Total       | 28.2        | MG/KG  | 0.34      | 1.0              |
|        |                       | Antimony, Total   | 0.48 u (    | MG/KG  | Q.4B      | 1.0              |
|        |                       | Selenium, Total   | 0.52 U      | MG/KG  | 0.52      | 1.0              |
|        |                       | Silicon, Total    | 450 1       | MG/KG  | 2.5       | 1.0              |
|        |                       | Venadium, Total   | 27.2        | MG/KG  | 0.1       | 1.0              |
|        |                       | Zinc, Total       | 84.0        | MG/KG  | 0.18      | 1.0              |

1/2a/04

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



**Analytical Report** 

Client: TNU-HANFORD RC-032

LVL#: 0604L712

SDG/SAF#: K0297/RC-032

W.O.#: 11343-606-001-9999-00

Date Received: 04-07-06

### METALS CASE NARRATIVE

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvLI) certifies that all test results meet the requirements of NELAC except as noted below.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

- 1. This narrative covers the analyses of 6 soil samples.
- 2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.
- 3. All analyses were performed within the required holding times.
- 4. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
- 5. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 6. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 7. All ICP Interference Check Standards were within control limits.
- 8. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 54.8%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.
- 9. The matrix spike (MS) recoveries for 5 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 26 pages.

10. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

|           |                | <u>PDS</u>          | <u>PDS</u> |
|-----------|----------------|---------------------|------------|
| Sample ID | <u>Element</u> | Concentration (ppb) | % Recovery |
| J11VJ3    | Aluminum       | 22,000              | 86.5       |
| •         | Iron           | 22,000              | 58.2       |
|           | Manganese      | 2,000               | 93.0       |
|           | Antimony       | 100                 | 101.1      |
|           | Silicon        | 2,100               | 89.5       |

- 11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 13. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

jjw/m04-712

fleulou Date



| Washington Closu  | re Hanford                   | CI              | HAIN OF CUST                      | CODY/SA  | MPLE                    | ANAL                      | YSIS   | REQUEST  |                    | RC              | C-032-030        | Puge 2   | of <u>3</u>                                |
|---|------------------------------|-----------------|-----------------------------------|--|-------------------------|---------------------------|--|--|--------------------|-----------------|------------------|--|--|
| Collector<br>Collinan   |                              |                 | nay Contact<br>Coffman            | Telepkono<br>528-640                             |                         |                           |  | Project Coordi<br>KESSNER, IH                                      | nator              | Price Code      | 81(              | Data Tu  | curaconuq 4                                |
| Project Designation<br>100-F Remaining Sites Buri                         | al Grounds - Soil Full Prote |                 | ing Location<br>7-F7 Verification |  |                         |                           |  | SAF No.<br>RC-032  |                    | Air Quality     | y []             | 15   | Day 8                                      |
| Ice Chest No. ERC-96  | 5-030                        |                 | Logbook No.<br>1   74-1           |  | COA<br>R607F720         | 00                        |  | Method of Shir<br>Fed Ex   | meni               |                 |                  |  | 99   |
| Skipped To EBERLINE SERVICES  | IONVILLE                     | Offsia          | Property No.                      | 1603   | 500                     | A0603.                    | 52   | Bill of Lading   | Air Biü N          | . SE            | E OST            | C  | <u></u>                                    |
| POSSIBLE SAMPLE HAZ   | ARDS/REMARKS                 |                 |                                   |  |                         |                           |  |  | -                  |                 | <u> </u>         |  |  |
| NA  |                              |                 | Preservation                      | Nous   | Coel 4C                 | Cool 4C                   | Cool   | <u> </u>   | Cool +C            |                 | <u> </u>         |  |  |
| Special Handling and/or   | Storage                      |                 | Type of Container                 | aG   | aG .                    | aG                        | aC   | a.G  | aG                 |                 |                  |  | <u> </u>                                   |
| Cool 4 degrees C  |                              |                 | No. of Container(s)               | '  | <u> </u>                | ı.                        | '  | 1  | 1                  | <u> </u>        |                  |  |  |
| 00  | •                            |                 | Volume                            | 250g   | 60mL                    | 60mL                      | 120r   | nL 120mL   | 125mL              |                 |                  |  |  |
| 000020  | SAMPLE ANAL)                 | YSIS            |                                   | See item (1) in<br>Special<br>Instructions.      | Chroatium<br>Hex - 7196 | PCBs - 8062               | Semi-V<br>\$270A (                               |  | Pesticides<br>8081 |                 |                  |  |  |
| Sample No.  | Matrix *                     | Sample Date     | Sample Time                       |  | Periot ye               |                           |  |  |                    |                 |                  |  |  |
| J11VJ3  | SOIL                         | 4/4/06          |                                   | X  | X                       | X                         | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \            |  | 大師薩羅               | TO THE STATE OF | STAGE VERY       | A STATE OF S |  |
| J11VJ4  | SOIL                         | 1/4/06          | 0835                              | <del>                                     </del> | $\stackrel{\frown}{X}$  | 1                         | <del>                                     </del> | <del>\</del> \ <del>\</del> \ \                                    | 1                  |                 | +                | <del>                                     </del>   | F7-6D                                      |
| J11VJ5  | SOIL                         | (               | 0845                              | X)   | $\frac{1}{X}$           | X                         | $\lambda$  | X  | x                  |                 | <del> </del> -   | <del>                                     </del>   | F7-7                                       |
| J11VJ6  | SOIL                         | <u> </u>        | 0855                              | X  | X                       | X                         | X  | X  | $\frac{1}{x}$      |                 |                  |  | F7-8                                       |
| J11VJ7  | SOIL                         | 4/4/06          |                                   | X  | X                       | X                         | X  | X  | X                  |                 | 1                |  | F7-9                                       |
| CHAIN OF POSSESSI   |                              | Sign/Prin       | t Names                           |  | SPE                     | CIAL INSTR                | UCTIO  | ONS  | <del></del>        | <del> </del>    |                  | .—.  | Matrix *                                   |
| Relinquished By/Removed From RT Coffm Av PT (Reliaquished By/Removed From | Date/Time   50 C             | REFER           | #2C 3728 .                        | late/Time / 50<br>4/4/00<br>late/Time            | (1) i<br>Cadı           | nium. Calcium,            | Chromiu  | nt List) (Aluminum,<br>km, Cobalt, Copper,<br>Silicon, Silver, Sod | iron, Lead,        | Magnesium Ma    | nganese. Molyb   | xienum,  | S=Soil<br>SE=Solimus<br>SO=Solul           |
| 3728#2C 4-6   | -06 1030                     | Resciped By St. | 100 4-6-06                        |  |                         | cu i desimani             | - The I de Land of I                             | , Suicoil, Suver, 500  | KAIIL VACIAO       | utu, zuicj: Mei | cury - 1470 - (1 | . ·  | S⊨Studge<br>W = Water<br>O=Oit             |
| Reliancisted 14/Removed From  | 4.6.06 / 1500                | Received By/Sio | 100 11                            | Mac I III te                                     |                         |                           |  |  |                    |                 |                  |  | A=An<br>DS=Drugs Subda<br>DL=Brugn Liquids |
| Religioshed By/Removed From   | Date/Time<br>-7.06 / 09.20   | Received By/Slo |                                   | hate/Time<br>7.04/0                              | <u></u>                 |                           |  |  |                    |                 |                  |  | T=Tissue<br>WI=Wipe<br>L=Liquid            |
| Relinquished By/Removed From  | Date/Time                    | Received By/Sto | ned to D                          | ate/Time   | - 1                     | sonnel not av             | vaiiable   | ta   |                    |                 |                  |  | V=Vegetation<br>X=Other                    |
| Relipquished By/Removed From  | Date/Time                    | Received By/Sto | ored In D                         | Date/Time  | Re                      | linquish sam<br>'# 2 on _ | stes from  | n 3728   |                    |                 |                  |  |  |
| LABORATORY Received SECTION   | Ву                           | _1              |                                   | Tid  |                         |                           |  |  | ·                  |                 | · · · · ·        | Date/Time  |  |
| FINAL SAMPLE Disposal DISPOSITION   | Method                       | · <del>y</del>  |                                   | <del></del>                                      |                         | Dispo                     | sed By   |  |                    | <u></u>         |                  | Date/Time  |  |
|   | <del></del>                  |                 |                                   |  |                         |                           |  | <del></del>  |                    | <del></del>     |                  |  |  |

| Washington Clos   | ure Hanford                            | CF                                    | IAIN OF CUST                          | ODY/S                                       | <b>AMPLE</b>           | ANAL                                   | YSIS                  | REQUES                                  | T   | RO               | C-032-030        | Page 3       | of 1   |
|---|--|---------------------------------------|---------------------------------------|---|------------------------|--|-----------------------|---|---|------------------|------------------|--------------|--|
| Collector<br>Coffman  |  |                                       | ny Contact<br>Coffman                 | Telephor<br>528-6                           |                        |  |                       | Project Coor<br>KESSNER, JI             |   | Price Code       | 8K               | _            | rnaround <sub>k</sub>                            |
| Project Designation<br>100-F Remaining Sites Bu                           | rial Grounds - Soil Full Prot          |                                       | ing Location<br>7-F7 Verification     |   |                        |  |                       | SAF No.<br>RC-032                       | ·<br>                                       | Air Qualit       | у 🗆              | 15           | DAYE   |
| Ire Chest No. ERC-  | 96-030                                 |                                       | .egbook No.<br>-1   74-1              |   | COA<br>R607F720        | 00                                     |                       | Method of St<br>Fed Ex                  | ioment                                      | ,<br>            |                  |              | 2<br>2<br>2                                      |
| Shipped To<br>EBERLINE SERVICES   |  | Offsite                               | Property No.                          | 060   | 352                    | p                                      |                       | Bill of Ladin                           | g/Air Bill                                  | No. SEE          | E 051            | ے م          | <b></b>  |
| POSSIBLE SAMPLE HA  | ZARDS/REMARKS                          |                                       |                                       |   |                        | }.                                     | 1                     |   | 1   |                  |                  | 1            | 1  |
| NA  |  |                                       | Preservation                          | None  | Cool 4C                | Ceel 4C                                | Cool                  |   | Cool  |                  |                  |              |  |
| Special Handling and/o  | n Ctaman                               |                                       | Type of Container                     | 4G  | aG                     | aG                                     | a-G                   | i aG                                    | aG  |                  |                  |              |  |
| Cool 4 degrees C  | it Stolage                             |                                       | No. of Container(s)                   | 1   | 1                      | ١                                      | 1                     | 1                                       | 1   |                  |                  |              |  |
| 0   |  |                                       | Velume                                | 250g  | 60mL                   | 60ml.                                  | 1200                  | nL 120mL                                | 1250  | ıL               |                  |              |  |
| 00021   | SAMPLE ANAL                            | Ysis                                  |                                       | See item (1) in<br>Special<br>Instructions, | Chronism<br>Hat - 7196 | PCBs - 8082                            | Semi-V-<br>8270A (    |   | A Pesticio<br>806                           |                  |                  |              |  |
| Sample No.  | . Matrix *                             | Sample Date                           | Sample Time                           |   |                        |  |                       |   |   |                  |                  |              | W.E.V.   |
| J11VJ8  | SOIL                                   | 4/4/06                                | 0915                                  | X   | X                      | X                                      | X                     |   | X   |                  |                  |              | F7-10  |
|   |  |                                       |                                       | ļ   | <del> </del>           |  |                       |   |   |                  |                  |              |  |
|   |  | <u> </u>                              |                                       | <u> </u>                                    | <del> </del>           |  | <b>}</b>              | }                                       |   |                  |                  | <del> </del> | <del>                                     </del> |
|   |  | · · · · · · · · · · · · · · · · · · · |                                       | <del> </del>                                | <del> </del>           |  |                       | _                                       |   |                  | <del></del>      | -            | -  |
| CHAIN OF POSSESS  | SION                                   | Sign/Prin                             | Names                                 |   | SPRO                   | IAL INSTE                              | etterie               | ONS                                     | <u>ــــــــــــــــــــــــــــــــــــ</u> |                  | <u>-</u>         | <u>.l</u>    | Matrix *   |
| Relinquished By/Removed From RTCoFFrmAil RTG Relinquished By/Removed From | Date/Time 1500  Thus 4/4/06  Date/Time | Received By/Stor                      | 2C, 3728                              | 4/4/04<br>ate/Time                          | (1) k                  | CP Metals - 60<br>Burn, Calcium,       | 010 (Clier<br>Chromiu | nt List) (Akuminuz<br>um, Cobalt, Coppe | , Iron, Lea                                 | d, Magnesium, M  | anganese, Molyl  | bilenum.     | S-Seul<br>SE-Sechances<br>SO-Soled               |
| 3728420 9   | 6-06 1030                              | Romined By Sty                        | Les 4-6-0                             | 6 10  | 30                     | ii, ruussium, .                        | oc munit              | , Silicon, Silver, S                    | XIUIL, YAN                                  | aduun, Zinc}: Me | rcury - 1470 - ( | C.V)         | Si=Simige<br>W = Wattr<br>O=Oit                  |
| Belinging and Street From   | 1 . 11 1 m / m                         | Received By/Sto                       | 74 417                                | tele/Time                                   | -                      |  |                       |   |   |                  |                  |              | A*Au<br>DS+Drum Solut-                           |
| Religatished By/Removed From  | Date/Time<br>1-7-06 / 09-20            |                                       | nd id                                 | ate/Time<br>F. 7-0(_                        | 10920                  | . •                                    |                       |   |   |                  |                  |              | OL=Otom Esqui<br>V=Tissue<br>WI=Wipe<br>L=Lagual |
| Relinquished By/Removed From  |  | Received By/Std                       | 7 7                                   | late/Time                                   | Pen                    | oanel not p                            |                       |   |   |                  |                  |              | X=Other<br>X=Other                               |
| Relinquished By/Removed From  | Date/Time                              | Received By/Sto                       | red in D                              | ate/Time                                    | refi<br>Ref            | nquish samp<br>1 <u>ZC</u> on <u>4</u> | les from              | 13728<br>106                            |   |                  |                  |              |  |
| LABORATORY Receive<br>SECTION   | ad By                                  |                                       | <u> </u>                              | T   | itle                   | ······································ |                       | · · · -                                 |   |                  | <del></del>      | Date/Time    | <del></del>                                      |
| FINAL SAMPLE Dispose DISPOSITION  | al Method                              | <del></del>                           |                                       |   |                        | Disp                                   | osed By               |   |   |                  |                  | Date/Time    |  |
| ···   | <del></del>                            |                                       | · · · · · · · · · · · · · · · · · · · |   |                        |  |                       |   |   |                  |                  |              |  |

# Appendix 5

**Data Validation Supporting Documentation** 

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| <u>V</u> ALIDATION<br>LEVEL:   | A   | В   |                 | D            | E   |
|--|---|---|-----------------|--------------|---|
| PROJECT:   | 607-F-7   |   | DATA PACKAG     | E: K0297     |   |
| VALIDATOR:   | +LI   | LAB: LLI  |                 | DATE: $4/2$  | 1/06  |
|  |   |   | SDG: K          | 0297         |   |
|  | ·   | ANALYSES  | PERFORMED       |              |   |
| SW-846/ICP   | SW-846/GFAA   | SW-846/Hg   | SW-846          |              |   |
|  | -   |   | Cyanide         |              |   |
|  | <u> </u>  |   |                 |              |   |
| SAMPLES/MAT  | RIX   |   |                 |              |   |
| J11VJ3   | THATY   | J11459  | JIINJ           | c Jiiwj      | 7 311458  |
| _  |   |   |                 |              |   |
| -  |   |   |                 |              |   |
| ·  | <del>-</del>  | <del>1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1</del> |                 |              |   |
|  | <u>.,</u>   |   |                 |              | Soil  |
|  |   |   |                 |              |   |
| :  | · .   |   |                 |              |   |
|  |   |   | CASE NARRATIV   |              | (A)   |
|  |   |   | CASE NARRATIV   |              | (A)   |
| Technical verificat  | ion documentation   |   |                 |              | (A)   |
| Technical verificat  | ion documentation   | present?  |                 |              | (A)   |
| Technical verificat  | ion documentation   | present?  |                 |              | (A)   |
| Technical verificat  | ion documentation   | present?  |                 |              | (A)   |
| Technical verificat  | ion documentation   | present?  |                 |              | (A)   |
| Technical verificat Comments:  | ion documentation   | present?  | IBRATIONS (Leve | els D and E) | Yes(Ng) N/.   |
| Technical verificat Comments:  2. INSTRUM Initial calibrations   | MENT PERFORM  | ANCE AND CAL  | IBRATIONS (Lev  | els D and E) | Yes No N/   |
| Technical verificat Comments:  2. INSTRUM Initial calibrations Initial calibrations  | MENT PERFORM performed on all in  | AANCE AND CAL                                       | IBRATIONS (Leve | els D and E) | Yes No N/.  |
| Technical verificat Comments:  2. INSTRUM Initial calibrations Initial calibrations ICP interference ch  | MENT PERFORM performed on all in acceptable?                                      | AANCE AND CAL                                       | IBRATIONS (Lev  | els D and E) | Yes No N/ Yes No N/ Yes No N/ Yes No N/   |
| Comments:  INSTRUM Initial calibrations ICP interference ch  | MENT PERFORM performed on all in acceptable? lecks acceptable?                    | ANCE AND CAL struments?                             | IBRATIONS (Leve | els D and E) | Yes No N/ Yes No N/ Yes No N/ Yes No N/ Yes No N/.  |
| Initial calibrations Initial calibrations ICP interference che ICV and CCV checking and CCV | MENT PERFORM performed on all in acceptable? ecks acceptable?                     | ANCE AND CAL struments?                             | IBRATIONS (Lev  | els D and E) | Yes No N/   |
| Initial calibrations Initial calibrations ICP interference che ICV and CCV check ICV | MENT PERFORM performed on all in acceptable? ecks acceptable?                     | AANCE AND CAL struments?                            | IBRATIONS (Leve | els D and E) | Yes No N/ |
| Technical verificat Comments:  2. INSTRUM Initial calibrations ICP interference che ICV and CCV check ICV and CCV check Standards traceable Standards expired?   | MENT PERFORM performed on all in acceptable? ecks acceptable? eks performed on al | ANCE AND CAL struments?                             | IBRATIONS (Lev  | els D and E) | Yes No N/   |

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| 3. BLANKS (Levels B, C, D, and E)                                       |  |
|---|--|
| ICB and CCB checks performed for all applicable analyses? (Levels D, E) | Yes No N/A   |
| ICB and CCB results acceptable? (Levels D, E)                           | Yes No (N/A)   |
| Laboratory blanks analyzed?   | (Yes) No N/A   |
| Laboratory blank results acceptable?                                    | Yes) No N/A  |
| Field blanks analyzed? (Levels C, D, E)                                 | Yes (No) N/A   |
| Field blank results acceptable? (Levels C, D, E)                        | Yes No N/A   |
| Transcription/calculation errors? (Levels D, E)                         | Yes No WA  |
| Comments:   | no FB  |
|   |  |
| 4. ACCURACY (Levels C, D, and E)  |  |
| MS/MSD samples analyzed?  | and the same of th |
| MS/MSD results acceptable?  | \ \ \  |
| MS/MSD standards NIST traceable? (Levels D, E)                          |  |
| MS/MSD standards expired? (Levels D, E)                                 |  |
| LCS/BSS samples analyzed?   | <u> </u>   |
| LCS/BSS results acceptable?   |  |
| Standards traceable? (Levels D, E)                                      |  |
| Standards expired? (Levels D, E)  | ~~~  |
| Transcription/calculation errors? (Levels D, E)                         | _  |
| Performance audit sample(s) analyzed?                                   | $\sim$   |
| Performance audit sample results acceptable?                            | Yes No (N/)A   |
| Comments: MS antimony 4570 - Jaly                                       | No Pay   |
| Les silien - 557, - Jall  |  |
|   |  |
|   |  |
|   |  |
|   |  |
|   |  |

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| 5. PRECISION (Levels C, D, and E)   | 6          |  |  |  |  |  |  |  |  |
|---|------------|--|--|--|--|--|--|--|--|
| Duplicate RPD values acceptable?  | YS No N/A  |  |  |  |  |  |  |  |  |
| Ouplicate results acceptable? Yes  MS/MSD standards NIST traceable? (Levels D, E) |            |  |  |  |  |  |  |  |  |
| MS/MSD standards NIST traceable? (Levels D, E)                                    |            |  |  |  |  |  |  |  |  |
| ield duplicate RPD values acceptable?  Yes ield split RPD values acceptable?  Yes |            |  |  |  |  |  |  |  |  |
| Field duplicate RPD values acceptable?  |            |  |  |  |  |  |  |  |  |
|   |            |  |  |  |  |  |  |  |  |
| Transcription/calculation errors? (Levels D, E)                                   | Yes No N/A |  |  |  |  |  |  |  |  |
| Comments:   |            |  |  |  |  |  |  |  |  |
|   |            |  |  |  |  |  |  |  |  |
| 6. ICP QUALITY CONTROL (Levels D and E)   | <u></u>    |  |  |  |  |  |  |  |  |
| ICP serial dilution samples analyzed?   | Yes No N/  |  |  |  |  |  |  |  |  |
| ICP serial dilution %D values acceptable?   | Yes No N/A |  |  |  |  |  |  |  |  |
| ICP post digestion spike required?  | Yes No N/A |  |  |  |  |  |  |  |  |
| ICP post digestion spike values acceptable?                                       | Yes No N/A |  |  |  |  |  |  |  |  |
| Standards traceable?  | Yes No N/A |  |  |  |  |  |  |  |  |
| Standards expired?  | Yes No N/A |  |  |  |  |  |  |  |  |
| Transcription/calculation errors?   | Yes No NA  |  |  |  |  |  |  |  |  |
| Comments:   | V          |  |  |  |  |  |  |  |  |
|   |            |  |  |  |  |  |  |  |  |
|   |            |  |  |  |  |  |  |  |  |
|   |            |  |  |  |  |  |  |  |  |

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| 7.     | FURNACE AA QUALITY CONTROL (Levels D and E)   |                                       | ,  |             |  |  |  |
|--------|---|---------------------------------------|----|-------------|--|--|--|
| Duplio | cate injections performed as required?  | Yes                                   | Nd | √I/A        |  |  |  |
|        | ruplicate injection %RSD values acceptable? Yes nalytical spikes performed as required? Yes |                                       |    |             |  |  |  |
| Analy  | tical spikes performed as required?   | Yes                                   | No | N/A         |  |  |  |
| Analy  | rtical spike recoveries acceptable?   | Yes                                   | No | N/A         |  |  |  |
| Standa | ards traceable?   | Yes                                   | No | N/A         |  |  |  |
| Standa | ards expired?   | Yes                                   | No | N/A         |  |  |  |
| MSA    | performed as required?  | Yes                                   | No | N/A         |  |  |  |
| MSA    | results acceptable?   |                                       |    | N/A         |  |  |  |
| Transc | cription/calculation errors?  | Yes                                   | No | N/A         |  |  |  |
| Comn   | nents:  |                                       |    | $\subseteq$ |  |  |  |
| 8.     | HOLDING TIMES (all levels)  |                                       |    |             |  |  |  |
|        | les properly preserved?   | Ye                                    | No | N/A         |  |  |  |
| _      | le holding times acceptable?  | 11 1                                  | No | N/A         |  |  |  |
| •      | nents:  | \ /                                   |    |             |  |  |  |
|        |   |                                       |    |             |  |  |  |
|        |   | · · · · · · · · · · · · · · · · · · · |    |             |  |  |  |
|        |   |                                       |    |             |  |  |  |
|        |   |                                       |    |             |  |  |  |

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

| 9.      | RESULT QUANTITATION AND DETECTION LIMITS (all levels) |              |
|---------|---|--------------|
| Results | reported for all requested analyses?                  | Yes) No N/A  |
| Results | reported for all requested analyses?                  | Yes No (N/A  |
| Sample  | s properly prepared? (Levels D, E)                    | Yes No 🕅     |
| Detecti | on limits meet RDL?                                   | Yes No N/A   |
| Transci | ription/calculation errors? (Levels D, E)             | Yes No (N/A) |
| Commo   | ents:   |              |
|         |   |              |
|         |   |              |
|         |   |              |
|         |   |              |
|         |   |              |
|         |   |              |

# Appendix 6

Additional Documentation Requested by Client

#### INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

BLANK1

LVL LOT #: 0604L712

0.02

1.0

|        |             |                   |        |       | REPORTING | DILUTION |
|--------|-------------|-------------------|--------|-------|-----------|----------|
| SAMPLE | SITE ID     | ANALYTE           | RESULT | UNITS | LIMIT     | FACTOR   |
| *****  | *********   | <b>22204</b>      |        |       | ********  | ******   |
| BLANK1 | 06L0225-MB1 | Silver, Total     | 0.07 u | MG/KG | 0.07      | 1.0      |
|        |             | Aluminum, Total   | 2.9 u  | MG/KG | 2.9       | 1.0      |
|        |             | Arsenic, Total    | 0.61 u | MG/KG | 0.61      | 1.0      |
|        |             | Boron, Total      | 0.24 u | MG/KG | 0.24      | 1.0      |
| •      |             | Barium, Total     | 0.02   | MG/KG | 0.02      | 1.0      |
|        |             | Beryllium, Total  | 0.02 u | MG/KG | 0.02      | 1.0      |
|        |             | Calcium, Total    | 2.0    | MG/KG | 1.6       | 1.0      |
|        |             | Cadmium, Total    | 0.07 ц | NG/KG | 0.07      | 1.0      |
|        |             | Cobalt, Total     | 0.14 u | MG/KG | 0.14      | 1.0      |
|        |             | Chromium, Total   | 0.13 u | MG/KG | 0.13      | 1.0      |
|        | ·           | Copper, Total     | 0.12 u | MG/KG | 0.12      | 1.0      |
|        |             | Iron, Total       | 3.5 u  | MG/XG | 3.5       | 1.0      |
|        |             | Potassium, Total  | 2.3 u  | MG/KG | 2.3       | 1.0      |
|        |             | Magnesium, Total  | 0.97 u | MG/KG | 0.97      | 1.0      |
|        |             | Manganese, Total  | 0.03 u | MG/KG | 0.03      | 1.0      |
|        |             | Molybdenum, Total | 0.29 u | MG/KG | 0.29      | 1.0      |
|        |             | Sodium, Total     | 0.96   | MG/KG | 0.76      | 1.0      |
|        |             | Nickel, Total     | 0.24 u | MG/KG | 0.24      | 1.0      |
|        |             | Lead, Total       | 0.31 u | MG/KG | 0.31      | 1.0      |
| -      |             | Antimony, Total   | 0.44 u | MG/KG | 0.44      | 1.0      |
|        |             | Selenium, Total   | 0.47 ц | MG/KG | 0.47      | 1.0      |
|        |             | Silicon, Total    | 2.3 u  | NG/KG | 2.3       | 1.0      |
|        | ·           | Venadium, Total   | D.09 u | MG/KG | 0.09      | 1.0      |
|        |             | Zinc, Total       | 0.15 u | MG/KG | 0.16      | 1.0      |
|        |             |                   |        |       |           |          |

Mercury, Total

#### INORGANICS ACCURACY REPORT 04/21/06

CLIENT: TNUHANPORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

| ·      |         |                   | SPIKED | INITIAL | SPIK <b>E</b> D | *      | DILUTION     |
|--------|---------|-------------------|--------|---------|-----------------|--------|--------------|
| SAMPLE | SITE ID | ANALYTE           | sample | RESULT  | AMOUNT          | ₹RECOV | Factor (SPK) |
| ****   |         |                   | ****** |         | ****            |        | 2222425442   |
| -001   | J11VJ3  | Silver, Total     | 4.9    | 0.08u   | 5.5             | 89.1   | 1.0          |
|        |         | Aluminum, Total   | 7060   | 4830    | 222             | 1006 * | 1.0          |
|        |         | Arsenic, Total    | 207    | 2.3     | 222             | 92.4   | 1.0          |
|        |         | Boron, Total      | 101    | 1.5     | 111             | 90.0   | 1.0          |
|        |         | Barium, Total     | 299    | 85.6    | 222             | 96.2   | 1.0          |
|        |         | Beryllium, Total  | 5.6    | 0.32    | 5.5             | 96.0   | 1.0          |
|        |         | Calcium, Total    | 6470   | 3440    | 2770            | 109.3  | 1.0          |
|        |         | Cadmium, Total    | 5.3    | 0.16    | 5.5             | 93.4   | 1.0          |
|        |         | Cobalt, Total     | 55.9   | 5.1     | 55.4            | 91.7   | 1.0          |
|        |         | Chromium, Total   | 30.4   | 7.9     | 22.2            | 101.4  | 1.0          |
|        | •       | Copper, Total     | 39.7   | 12.5    | 27,7            | 98.2   | 1.0          |
|        |         | Iron, Total       | 14700  | 11800   | 111             | 2605 * | 1.0          |
|        |         | Mercury, Total    | 0.24   | 0.02    | 0.19            | 117.2  | 1.0          |
|        |         | Potassium, Total  | 3620   | 949     | 2770            | 96.3   | 1.0          |
|        |         | Magnesium, Total  | 6300   | 3080    | 2770            | 116.2  | 1.0          |
|        |         | Manganese, Total  | 329    | 253     | 55.4            | 136.1* | 1.0          |
|        | •       | Molybdenum, Total | 100    | 0.51    | 111             | 90.2   | 1.0          |
|        |         | Sodium, Total     | 2600   | 89.5    | 2770            | 90,6   | 1.0          |
|        |         | Nickel, Total     | 62.4   | 9. L    | 55.4            | 96.2   | 1.0          |
|        |         | Lead, Total       | 57.9   | 6.2     | 55.4            | 93.3   | 1.0          |
|        |         | Antimony, Total   | 25.0   | 0.49u   | 55.4            | 45.1   | 1.0          |
|        |         | Selenium, Total   | 201    | 0.52u   | 222             | 90.B   | 1.0          |
|        |         | Silicon, Total    | 648    | 456     | 111             | 173.0* | 1.0          |
|        |         | Vanadium, Total   | 82.1   | 25.5    | 55.4            | 102.2  | 1.0          |
|        |         | 2inc, Total       | 94.0   | 36.0    | 55.4            | 104.7  | 1.0          |
|        |         |                   |        |         |                 |        |              |

## INORGANICS PRECISION REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297
WORK ORDER: 11343-606-001-9999-00

|         |         |                   | INITIAL        | •         |       | DILUTION                                |
|---------|---------|-------------------|----------------|-----------|-------|---|
| Sample  | SITE ID | ANALYTE           | result         | REPLICATE | RPD   | PACTOR (REP)                            |
| *****   |         |                   | *****          |           | ***** | ======================================= |
| -001REP | J11VJ3  | Silver, Total     | 0.0 <b>8</b> u | 0.080     | NC    | 1.0                                     |
|         |         | Aluminum, Total   | 4830           | 5250      | 6.2   | 1.0                                     |
| •       | •       | Arsenic, Total    | 2.3            | 2.4       | 4.3   | 1.0                                     |
|         |         | Boron, Total      | 1.5            | 1.4       | 6.9   | 1.0                                     |
| •       |         | Barium, Total     | 85.6           | 89.8      | 4.8   | 1.0                                     |
|         | •       | Beryllium, Total  | 0.32           | 0.35      | 9.0   | 1.0                                     |
|         |         | Calcium, Total    | 3440           | 3740      | 8.2   | 1.0                                     |
|         |         | Cadmium, Total    | 0.15           | 0.19      | 14.0  | 1.0                                     |
|         |         | Cobalt, Total     | 5.1            | 5.7       | 11.1  | 1.0                                     |
|         | 4       | Chromium, Total   | 7.9            | 8.6       | 8.5   | 1.0                                     |
|         |         | Copper, Total     | 12.5           | 13.7      | 9.2   | 1.0                                     |
|         |         | Iron, Total       | 11800          | 12900     | 8.7   | 1.0                                     |
|         |         | Mercury, Total    | 0.02           | 0.02      | 19.0  | 1.0                                     |
|         |         | Potassium, Total  | 949            | 1040      | 9.5   | 1.0                                     |
|         |         | Magnesium, Total  | 3080           | 3360      | 8.5   | 1.0                                     |
|         |         | Manganese, Total  | 253            | 271       | 6.8   | 1.0                                     |
|         |         | Molybdenum, Total | 0.51           | 0.61      | 18.2  | 1.0                                     |
|         |         | Sodium, Total     | 89.5           | 94.8      | 5.8   | 1.0                                     |
|         |         | Nickel, Total     | 9.1            | 10.5      | 14.3  | 1.0                                     |
|         |         | Lend, Total       | 6.2            | 5.3       | 1.6   | 1.0                                     |
|         |         | Antimony, Total   | 0.49u          | 0.49u     | NC    | 1.0                                     |
|         |         | Selenium, Total   | 0.52u          | 0.52u     | NC    | 1.0                                     |
|         |         | Silicon, Total    | 456            | 537       | 16.3  | 1.0                                     |
|         |         | Vanadium, Total   | 25.5           | 28.8      | 12.2  | 1.0                                     |
|         |         | Zinc, Total       | 36.0           | 40.3      | 11.3  | 1.0                                     |

### INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/21/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

|        | ·              | 2               | 8PIKED | SPIKED |       |        |
|--------|----------------|-----------------|--------|--------|-------|--------|
| Sample | SITE ID        | ANALYTE         | Sample | AMOUNT | UNITS | *RECOV |
|        | ************** | *************   |        | *****  | ***** |        |
| LCS1   | 06L0225-LC1    | Silver, LCS     | 46.8   | 50.0   | MG/KG | 93.6   |
|        |                | Aluminum, LCS   | 464    | 500    | MG/KG | 92.8   |
|        |                | Arsenic, LCS    | 911    | 1000   | MG/KG | 91.1   |
|        |                | Boron, LCS      | 461    | 500    | MG/KG | 92.1   |
|        |                | Barium, LCS     | 470    | 500    | MG/KG | 94-0   |
|        | •              | Beryllium, LCS  | 23.9   | 25.0   | MG/KG | 95.6   |
|        |                | Calcium, LCS    | 2400   | 2500   | MG/KG | 96.1   |
|        | •              | Cadmium, LCS    | 23.6   | 25.0   | MG/KG | 94.4   |
|        |                | Cobalt, LCS     | 235    | 250    | MG/KG | 94.0   |
|        | •              | Chromium, LCS   | 47.7   | 50.0   | MG/KG | 95.4   |
|        |                | Copper, LCS     | 118    | 125    | NG/KG | 94.1   |
|        |                | Iron, LCS       | 474    | 500    | MG/KG | 94.7   |
|        |                | Potaneium, LCS  | 2200   | 2500   | MG/KG | 88.1   |
|        |                | Magnesium, LCS  | 2360   | 2500   | MG/KG | 94.5   |
|        |                | Manganese, LCS  | 72.7   | 75.0   | MG/KG | 96.9   |
|        |                | Molybdenum, LCS | 479    | 500    | MG/KG | 95.5   |
|        |                | Sodium, LCS     | 2230   | 2500   | MG/KG | 89.1   |
|        |                | Nickel, LCS     | 189    | 200    | MG/KG | 94.5   |
|        |                | Lead, LCS       | 236    | 250    | MG/KG | 94.5   |
|        |                | Antimony, LCS   | 277    | 300    | MG/KG | 92.4   |
|        | ·              | Selenium, LCS   | 889    | 1000   | MG/KG | 88.9   |
|        |                | Silicon, LCS    | 274    | 500    | MG/KG | 54.8   |
|        |                | Vanadium, LCS   | 237    | 250    | MG/KG | 95.0   |
|        |                | Zinc, LCS       | 92.5   | 100    | NG/KG | 92.5   |
| i.csi  | 06C0070-LC1    | Mercury, LCS    | 6.6    | 6.2    | MG/KG | 106.1  |

Date:

2 June 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-F Remaining Sites Burial Grounds - Soil Full Protocol - Waste

Sites 1607-F-7

Subject: Volatile Organics - Data Package No. K0297-LLI

## INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample (D) | a Samiple Dalek |      | i univasiráleវិបិត្តក្រុងប | ) Date        |
|------------|-----------------|------|----------------------------|---------------|
| J11VJ3*    | 4/4/06          | Soil | С                          | VOAs by 8260B |
| J11VJ4*    | 4/4/06          | Soil | С                          | VOAs by 8260B |
| J11VJ5     | 4/4/06          | Soil | С                          | VOAs by 8260B |
| J11VJ6*    | 4/4/06          | Soil | С                          | VOAs by 8260B |
| J11VJ7     | 4/4/06          | Soil | С                          | VOAs by 8260B |
| J11VJ8     | 4/4/06          | Soil | С                          | VOAs by 8260B |

<sup>\* -</sup> Reprepared and reanalyzed.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

### DATA QUALITY OBJECTIVES

### Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within 14 days of the date of sample collection. If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two

times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

#### Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U".

Due to method blank contamination, the chloroform results in all samples were raised to the RQL, qualified as undetected and flagged "U".

Due to method blank contamination, all detected 2-hexone results (J11VJ3, J11VJ4, J11VJ6, J11VJ8) were raised to the RQL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

### Field Blanks

No field blanks were submitted for analysis.

#### Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate

analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples J11VJ3, J11VJ4 and J11VJ6 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

## Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to a surrogate recovery outside QC limits (149%), the ethylbenzene, xylene and styrene results in sample J11VJ3 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

## · Precision

## Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of  $\pm$ -30%. If RPD values are out of specification and the sample concentration is less than five times the spike

concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to an RPD outside QC limits, the bromoform results in all samples (except J111VJ3, J11VJ4 & J111VJ6) were qualified as estimate and flagged "J".

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples J11VJ3, J11VJ4 and J11VJ6 were qualified as estimates and flagged "J".

All other precision results were acceptable.

## Field Duplicate Samples

One set of field duplicates (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

## · Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Fifty-seven analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

## · Completeness

Data package No. KO297 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U".
- Due to method blank contamination, the chloroform results in all samples were raised to the RQL, qualified as undetected and flagged "U".
- Due to method blank contamination, all detected 2-hexone results (J11VJ3, J11VJ4, J11VJ6, J11VJ8) were raised to the RQL, qualified as undetected and flagged "U".
- Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples J11VJ3, J11VJ4 and J11VJ6 were qualified as estimates and flagged "J".
- Due to a surrogate recovery outside QC limits (149%), the ethylbenzene, xylene and styrene results in sample J11VJ3 were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits, the bromoform results in all samples (except J111VJ3, J11VJ4 & J111VJ6) were qualified as estimate and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Fifty-seven exceeded the RQL. Under the WCH statement of work, no qualification is required.

#### **REFERENCES**

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

000005

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

# **VOLATILE ORGANIC DATA QUALIFICATION SUMMARY\***

| SECTION SECTION                   | EE VIII VIII BE | <b>1607-6</b> 7                       | PAGE 1 OF 1  |
|-----------------------------------|-----------------|---------------------------------------|--|
| COMMENTS:                         |                 |                                       | HELENDAR MARK ARDE MAR EIN PARK REIL PROMERNING MARK MARKET MARKET MARKET MARKET MARKET MARKET MARKET MARKET M |
| COMPOUND                          | QUALIFIER       | SAMPLES AFFECTED                      | REASON   |
| Methylene chloride                | U               | All                                   | Blank contamination  |
| Chloroform                        | U at RQL        | All                                   | Blank contamination  |
| 2-Hexanone                        | U at RQL        | J11VJ3, J11VJ4<br>J11VJ6, J11VJ8      | Blank contamination  |
| All                               | J               | J11VJ3, J11VJ4<br>J11VJ6              | No MS/MSD  |
| Ethylbenzene<br>Styrene<br>Xylene | J               | J11VJ3                                | Surrogate recovery   |
| Bromoform                         | J               | All (except J11VJ3,<br>J11VJ4 J11VJ6) | RPD  |

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

· 其中的原因,有量是"数量"的更要的更多的。 (1996年)。 (1997年)

# Appendix 3

**Qualified Data Summary and Annotated Laboratory Reports** 

| Project: WASHINGTON CLO    | SURE H | ANFORD  |          | ]        |          |              |          |          |          |          |          |
|----------------------------|--------|---------|----------|----------|----------|--------------|----------|----------|----------|----------|----------|
| Laboratory: LLI            |        |         |          |          |          |              |          |          |          |          |          |
|                            | SDG: K |         |          |          |          | <del>,</del> |          |          |          |          |          |
| Sample Number              |        | J11VJ3  |          | J11VJ3R  | J11VJ4   | J11VJ4R      | J11VJ5   | J11VJ6   | J11VJ6R  | J11VJ7   | J11VJ8   |
| Remarks                    |        |         |          |          |          |              |          |          |          |          |          |
| Sample Date                |        | 4/4/06  |          | 4/4/06   | 4/4/06   | 4/4/06       | 4/4/06   | 4/4/06   | 4/4/06   | 4/4/06   | 4/4/06   |
| Analysis Date              |        | 4/14/06 |          | 4/17/06  | 4/14/06  | 4/17/06      | 4/17/06  | 4/14/06  | 4/17/06  | 4/17/06  | 4/17/06  |
|                            |        |         | Q        | Result Q | Result Q | Result Q     | Result Q | Result Q | Result Q | Result Q | Result Q |
| Chloromethane              | 10     |         |          | 11 U     | 12 UJ    | 11 U         | 12 U     | 12 UJ    | 11 U     | 11 U     | 11 U     |
| Bromomethane               | 10     | 12      |          | 11 U     | 12 UJ    | 11 U         | 12 U     | 12 UJ    | , 11 U   | 11 U     | 11 U     |
| Vinyl Chloride             | 10     |         | UJ       | 11 U     | 12 UJ    | 11 U         | 12 U     | 12 UJ    | 11 U     | 11 U     | 11 U     |
| Chloroethane               | 10     | 12      |          | 11 U     | 12 UJ    | 11 U         | 12 U     | 12 UJ    | 11 U     | 11 U     | 11 U     |
| Methylene Chloride         | 10     |         | ŲJ       | 18 U     | 12 UJ    | 15 U         | 13 U     | 12 UJ    | 17 U     | 17 U     | 14 U     |
| Acetone                    | 10     | 12      |          | 15       | 8 J      | 14           | 29       | 8 J      | 22       | 11       | 10       |
| Carbon Disulfide           | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 N1     | 6 U      | 6 U      | 6 U      |
| 1,1-Dichloroethene         | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| 1,1-Dichloroethane         | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| 1,2-Dichloroethene (total) | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Chloroform                 | 10     |         | ŲJ       | 10 U     | 10 UJ    | 10 U         | 10 U     | 10 UJ    | 10 U     | 10 U     | 10 U     |
| 1,2-Dichloroethane         | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 NY     | 6 U      | 6 U      | 6 U      |
| 2-Butanone                 | 10     | 7       | J        | 11 U     | 12 UJ    | 11 U         | 12 U     | 12 UJ    | 11 U     | 11 U     | 11 U     |
| 1,1,1-Trichloroethane      | 10     | 6       |          | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Carbon Tetrachloride       | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Bromodichloromethane       | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| 1,2-Dichloropropane        | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| cis-1,3-Dichloropropene    | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Trichloroethene            | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Dibromochloromethane       | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| 1,1,2-Trichloroethane      | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Benzene                    | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| trans-1,3-Dichloropropene  | 10     |         | UJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Bromoform                  | 10     |         | IJ       | 6 UJ     | 6 UJ     | 6 JUJ        | 6 UJ     |
| 4-Methyl-2-pentanone       | 10     |         | <u>J</u> | 11 U     | 3 J      | 11 U         | 12 U     | 12 UJ    | 11 U     | 11 U     | 11 U     |
| 2-Hexanone                 | 10     |         | IJ       | 11 U     | 10 UJ    | 11 U         | 12 U     | 10 UJ    | 11 U     | 11 U     | 10 U     |
| Tetrachloroethene          | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| 1,1,2,2-Tetrachloroethane  | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Toluene                    | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 Ü      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Chlorobenzene              | 10     |         | IJ       | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Ethylbenzene               | 10     |         | J        | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Styrene                    | 10     | 3       | J        | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| Xylene                     | 10     |         | J        | 6 U      | 6 UJ     | 6 U          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| cis-1,2-Dichloroethene     | 10     |         | UJ       | 6 U      | 6 UJ     | 6 ป          | 6 U      | 6 UJ     | 6 U      | 6 U      | 6 U      |
| trans-1,2-Dichloroethene   | 10     | 6       | IJ       | 6 ป      | 6 UJ     | 6 N          | 6 U      | 6 N1     | 6 U      | 6 U      | 6 U      |

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#### Lionville Laboratory, Inc.

RFW Batch Number: 0604L712

Volatiles by GC/MS, HSL List

Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 1a

Report Date: 04/21/06 13:55

00000000 Cust ID: J11VJ3 J11VJ3 J11VJ4 J11VJ4 J11VJ5 JIIVJ6 Sample REW#: 001 001 002 002 003 004 Information Matrix: SOIL SOIL SOIL SOIL SOIL SOIL D.F.: 1.02 0.980 1.04 0.980 1.00 1.04 Units: uq/Kq ug/Kg ug/Kg uq/Ka ug/Kg uq/Kq REPREP REPREP Toluene-d8 149 \* % 126 138 왐 122 110 ¥ 134 Surrogate Bromofluorobenzene 164 \* % 122 151 \* % 135 \* % 99 159 \* % Recovery 1,2-Dichloroethane-d4 150 141 143 133 120 144 Chloromethane 11 T 12 IJ 11 12 u Bromomethane 12 U 11 U 12 IJ 11 U 12 12 U Vinyl Chloride 12 U 11 U 12 U 11 U 12 12 П Chloroethane 12 11 IJ 12 y 11 U 12 U 12 Ħ Methylene Chloride BU J 13 18 12 15 13 12 Ū Acetone 12 15 14 29 8 Carbon Disulfide IJ U U U C 1,1-Dichloroethene Ħ U 1,1-Dichloroethane E) U IJ. IJ 1,2-Dichloroethene (total) IJ IJ U 6 U Chloroform \_\_\_\_ 1,2-Dichloroethane Ū 6 6 Ü 6 ω<sub>2-Butanone</sub> 11 U 12 IJ 11 12 12 1,1,1-Trichloroethane U 6 U Carbon Tetrachloride U IJ П 6 U Bromodichloromethane П U Ū 1,2-Dichloropropane IJ U П cis-1,3-Dichloropropene 6 П U U U Trichloroethene П U U U Dibromochloromethane 11 U U IJ 1,1,2-Trichloroethane IJ U Ħ б U Benzene IJ U [] 6 IJ Trans-1,3-Dichloropropene\_\_\_\_ IJ IJ U 6 IJ Bromoform IJ υJ Π 6 [] 4-Methyl-2-pentanone\_\_\_\_ 7 Km 11 12 U 12 U 2-Hexanone 33/201B U 12 Tetrachloroethene U U Ū 6 1,1,2,2-Tetrachloroethane U 6 U U Toluene U П 6 U \*= Outside of EPA CLP OC limits.

5/29/00

| RFW Batch Number: 0604L | 712 Clis  | <u>ent: TNUHANFOR</u> | D RC-032 K0297 | Work Order: | 11343606001   | <u>Page: 1b</u> |                 |
|-------------------------|-----------|-----------------------|----------------|-------------|---------------|-----------------|-----------------|
|                         | Cust ID:  | J11VJ3                | J11VJ3         | J11VJ4      | J11VJ4        | J11VJ5          | J11VJ6          |
|                         | RFW#:     | 001                   | 001<br>REPREP  | 002         | 002<br>REPREP | 003             | ග<br>004 ග<br>ග |
| Chlorobenzene           |           | 6 U J                 | 6 U            | 6 U         | 6 U           | 6 U             | 6 UJ &          |
| Ethylbenzene            |           | 3 7                   | 6 U            | 6 U         | 6 บ           | 6 U             | 6 U 6 8         |
| Styrene                 |           | 3 74                  | 6 U            | 6 U         | 6 U           | 6 U             | 6 U 6           |
| Xylene (total)          |           | 5 J                   | 6 U            | 6 U         | 6 U           | 6 U             | 6 U (           |
| cis-1,2-dichloroethene_ |           | 6 U                   | 6 U            | 6 U         | . 6 U         | 6 U             | 6 U.            |
| trans-1,2-dichloroethen | e         | 6 U V                 | 6 U            | 6 U ₩       | 6 U           | 6 U             | 6 UV            |
| *= Outside of EPA CLP Q | C limits. |                       |                |             |               |                 | •               |

<sup>5/29/04</sup> 

Lionville Laboratory, Inc.

Volatiles by GC/MS, HSL List

Report Date: 04/21/06 13:55 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 2a RFW Batch Number: 0604L712 J11VJ7 J11VJ7 Cust ID: J11VJ6 J11VJ7 J11VJB **VBLKWS** 005 005 MS 004 005 MSD 006 06LVK055-MR1 RFW#: Sample SOIL SOIL SOTE Information Matrix: SOIL SOIL SOIL. 0.962 1 00 D.F.: 0.980 1.00 0.9801 00 uq/Kq ua/Ka Units: uq/Ka ug/Kg ug/Kg ug/Kg REPREP Toluene-d8 122 120 % 123 と 126 Ł 118 ž 115 ۶ 141 \* % 138 \* % Surrogate Bromofluorobenzene 125 \* % 144 \* % 116 ¥ 122 왐 129 124 145 1,2-Dichloroethane-d4 143 131 131 Recovery Chloromethane 11 U Bromomethane 11 U 11 U 76 11 U 10 U Vinyl Chloride . 11 U 11 U 11 U Ū Chloroethane 11 U 11 U 91 11 U 10 U Methylene Chloride 17 51 17 20 73 68 Acetone 11 26 188 153 10 10 τr Carbon Disulfide Ŭ 6 ປ 85 17 🔼 ,1-Dichloroethene\_\_\_\_\_ 6 U Ü 98 91 ş. U 1.1-Dichloroethane П U 109 103 6 U U 9,2-Dichloroethene (total) 6 Π U 92 85 Ü Chloroform \_\_\_\_\_ 102 94 ,2-Dichloroethane\_\_\_\_ 5 U ับ 131 118 U 2-Butanone\_\_\_\_ 11 U 11 U 131 118 11 U 1,1,1-Trichloroethane 6 U U 125 118 U IJ Carbon Tetrachloride\_\_\_\_\_ [] 6 U 119 113 6 U U Bromodichloromethane IJ 6 U 113 105 6 U U 1,2-Dichloropropane\_\_\_\_ 6 U 106 98 6 U U cis-1,3-Dichloropropene \_\_\_\_\_ ŢŢ 103 IJ Trichloroethene \_\_\_\_ U U 107 100 6 [] П Dibromochloromethane \_\_\_\_\_ U 127 116 6 U U 1,1,2-Trichloroethane U 117 107 6 U U Benzene U 1.00 93 6 II Trans-1,3-Dichloropropene IJ U 100 90 U 6 U.J Bromoform บปิ 6 U.T 71 101 4-Methyl-2-pentanone 11 U 2-Hexanone U 11 U 110 11 U U 11 U 82 옿 76 6 U Tetrachloroethene 109 1.02 U 1,1,2,2-Tetrachloroethane\_\_\_\_\_

6 U

6 II

Toluene

\*= Outside of EPA CLP QC limits.

132 \* %

ş

106

N 5/25/00

6 U

5 U

5 U

126

98 %

J11VJ6

J11VJ7

J11VJ8

|                            | RFW#: | 004<br>REPF | _ | 005 |   | 005 M | S | 005 MS | D | 006 |   | 06LVK055-M | Bl |
|----------------------------|-------|-------------|---|-----|---|-------|---|--------|---|-----|---|------------|----|
| Chlorobenzene              |       | 6           | U | 6   | U | 93    | ४ | 87     | १ | 6   | U | 5          | U  |
| Ethylbenzene               |       | 6           | U | 6   | Ü | 97    | 욯 | 91     | 왕 | 6   | U | 5          | υ  |
| Styrene                    |       | 6           | U | 6   | U | 76    | g | 74     | & | 6   | U | 5          | U  |
| Xylene (total)             |       | 6           | U | 6   | ប | 92    | ફ | 89     | ક | 6   | υ | 5          | Ū  |
| cis-1,2-dichloroethene     |       | 6           | U | 6   | ប | 93    | 8 | 86     | r | 6   | Ū | 5          | Ü  |
| trans-1,2-dichloroethene_  |       | 6           | U | 6   | U | 90    | ફ | 85     | ક | 6   | Ū |            | Ω  |
| *= Outside of EPA CLP OC 1 | imits |             |   |     |   |       |   |        |   | _   | • | Ū          | •  |

J11VJ7

Cust ID:

p 5/29/00

<sup>\*=</sup> Outside of EPA CLP QC limits.

## Lionville Laboratory, Inc.

Volatiles by GC/MS, HSL List

Report Date: 04/21/06 13:55 Client: TNUHANFORD RC-032 K0297 Work Order: 11343606001 Page: 3a RFW Batch Number: 0604L712

| Cust ID:                       | VBLKWS BS   | VBLKWT        | VBLKWT BS            |  |
|--------------------------------|-------------|---------------|----------------------|--|
| Sample RFW#:                   | 06LVK055-MB | 1 06LVK056-ME | 1 06LVK056-M         | 81   |
| Information Matrix:            | SOIL        | SOIL          | SOIL                 | <del></del>  |
| D,F.:                          | 1.00        |               |                      | 0  |
| Units:                         | ug/Kg       |               |                      |  |
|                                |             |               | — <del>— — — .</del> |  |
| Toluene-d8                     | 114         | <b>\$</b> 108 | <b>%</b> 112         | <b>}</b>   |
| Surrogate Bromofluorobenzene   | 119         | <b>%</b> 116  | <b>%</b> 119         | 2  |
| Recovery 1,2-Dichloroethane-d4 |             | <b>%</b> 121  | <b>%</b> 133         | ¥  |
|                                | =========   | fl=========   | fl=========          | =fl===========fl=======fl==========fl  |
| Chloromethane                  | _ 86        |               | Ծ 75                 | <b>&amp;</b>   |
| Bromomethane                   | _ 96        | <b>t</b> 10   | U 74                 | 8  |
| Vinyl Chloride                 | 82          | <b>ቴ</b> 10   | U 81                 | *  |
| Chloroethane                   | 97          | <b>ኔ</b> 10   | Ū 9 <b>4</b>         | *  |
| Methylene Chloride             | _ 70        | <b>8</b>      | 69                   | 8  |
| Acetone                        | 180         | <b>t</b> 10   | Ū 204                | ¥  |
| Carbon Disulfide               | 100         | <b>*</b> 5    | U 98                 | *  |
| 1,1-Dichloroethene             | _ 103       | <b></b>       | U 102                | *  |
| 1,1-Dichloroethane             | _ 109       | <b>₹</b> 5    | Ū 107                | *  |
| 1,2-Dichloroethene (total)     |             | <b>t</b> 5    | U 96                 | *  |
| Chloroform                     | _ 103       | <b>%</b> 2    | J. 100               | *  |
| 1,2-Dichloroethane             | _ 138       | k 5           | U 126                | *  |
| 2-Butanone                     | _ 133       | t 10          |                      | & Control of the Cont |
| 1,1,1-Trichloroethane          | _ 134       | <b>\$</b> 5   | Ŭ 131                | ¥  |
| Carbon Tetrachloride           | _ 133       | <b>ਫੈ</b> 5   | U 133                | 8  |
| Bromodichloromethane           | _ 117       | <b>8</b> 5    | บ 115                | *  |
| 1,2-Dichloropropane            | _ 106       | <b>\$</b> 5   | U 104                | %  |
| cis-1,3-Dichloropropene        | _ 97        | <b>š</b> 5    | U 101                | <b>%</b>   |
| Trichloroethene                | 132         | <b>t</b> 5    | U 121                | <b>%</b>   |
| Dibromochloromethane           | _ 120       | <b>š</b> 5    | U 115                | *  |
| 1,1,2-Trichloroethane          |             | <b>\$</b> 5   | Ŭ 99                 | ,<br>g   |
| Benzene                        | _ 103       | <b>5</b>      | U 103                | १  |
| Trans-1,3-Dichloropropene      | 90          | <b>å</b> 5    | U 97                 | 8  |
| Bromoform                      | 115         | <b>5</b>      | U 114                | 8  |
| 4-Methyl-2-pentanone           | _ 101       | <b>a</b> 4    | J 102                | * / -  |
| 2-Hexanone                     | _ 111       | <b>å</b> 3    | J 122                | * / /  |
| Tetrachloroethene              | _ 117       | <b>š</b> 5    | Ŭ 115                | * 16/4   |
| 1,1,2,2-Tetrachloroethane      |             | <b>\$</b> 5   | ប 95                 | 5/29/01  |
| Toluene                        | _ 103       | t 5           | U 100                | <sup>8</sup>   |

\*= Outside of EPA CLP QC limits.

310000

Mr 5/24/0

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



#### Case Narrative

Client: TNU-HANFORD RC-032

LVL#: 0604L712

SDG/SAF # K0297/RC-032

W.O. #: 11343-606-001-9999-00 Date Received: 04-07-2006

#### GC/MS VOLATILE

Six (6) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8260B for TCL volatile target compounds on 04-14,17-2006.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

- 1. Samples were analyzed within required holding time.
- 2. Non-target compounds were detected in the samples.
- 3. Nine (9) of forty-five (45) surrogate recoveries were outside acceptance criteria. The analysis of associated matrix spike samples fulfills the reanalysis requirement of sample J11VJ7. All other out of criteria samples were reanalyzed on 04-17-2006 and reported.
- 4. One (1) of seventy (70) matrix spike recoveries was outside acceptance criteria.
- 5. All blank spike recoveries were within acceptance criteria.
- 6. The method blank 06LVK055-MB1 contained the common laboratory contaminant Methylene Chloride at a level less than 2x the CRQL and the target compounds Chloroform and 2-Hexanone at levels less than the CRQL. The method blank 06LVK056-MB1 contained the common laboratory contaminant Methylene Chloride at a level less than 2x the CRQL and the target compounds Chloroform, 4-Methyl-2-pentanone, 2-Hexanone, Xylenes (total) and Styrene at levels less than the CRQL.
- 7. Internal standard area criteria were not met for several samples. The analysis of associated matrix spike duplicate fulfills the reanalysis requirement of sample J11VJ7 MS. All other out of criteria samples were reanalyzed on 04-17-2006 and reported.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2.7 pages.



- 8. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
- 9. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 10. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

som\group\data\voa\tnu-hanford\0604-712.doc

4/26/06 Date

| Washington Clo                              | Washington Closure Hanford CHAIN OF C |                  |   |   | MPL                    | E ANALY                                       | <b>YSIS</b>          | REQUEST                                    |                    | RC-032-030  |                  | Page 2 of 3   |                                  |
|---|---------------------------------------|------------------|---|---|------------------------|---|----------------------|--|--------------------|---|------------------|---------------|----------------------------------|
| Collector<br>Collman                        |                                       |                  | av Contact<br>Coffman   | Telephone<br>528-640                        |                        |   |                      | Project Coordi<br>KESSNER, JH              | nstor              | Price Code  | 816              | Data Tu       | rnaround                         |
| Project Designation 100-F Remaining Sites ! | Burial Grounds - Soil Full Prot       |                  | ing Location<br>7-F7 Verification   |   |                        |   |                      | SAF No.<br>RC-032                          |                    | Air Quality                                       | <i>r</i> 🗆       | 15            | Daya                             |
| ice Chest No. ERC-                          | 96-030                                |                  | arbook No.<br>-[174-]   |   | COA<br>R607F72         | .000  |                      | Method of Ship<br>Fed Ex                   | ment               |   |                  |               | ନ୍ଧର                             |
| Shipped To<br>EBERLINE SERVICES             | (LIONVILLE)                           | Offsite          | Property No. 4  | 1603  | 500                    | A0603   | 52                   | Bill of Lading                             | Air Blii N         | ". SE   | E OSP            | 0             | w w                              |
| POSSIBLE SAMPLE H                           |                                       |                  |   |   |                        | ·   | · ·                  | <u> </u>                                   |                    |   | <u> </u>         | 1             |                                  |
| NA  |                                       |                  | Preservation  | Ness  | Coal 4C                | Cael 4C                                       | Cool                 | 4C Cool 4C                                 | Cool 4C            |   |                  |               |                                  |
| Special Haudling and                        | /or Storage                           | i                | Type of Container   | aG  | ₽G                     | aG  | aG                   |  | aG                 |   |                  |               |                                  |
| Cool 4 degrees C                            |                                       |                  | No. of Container(s)   |   | 1                      | 1   | 1                    | 1  | 1                  | · ·   | 1                |               |                                  |
| 00  |                                       | Volume           | 250g  | 60mL  | 60mL                   | 120c  | nL 120mL             | I25mL                                      |                    |   |                  |               |                                  |
| 0022  | SAMPLE ANALY                          | /SIS             |   | See item (1) in<br>Special<br>fastructions. | Chromium<br>Hex - 7196 | PCBs - 8082                                   | Semi-V<br>2270A (    |  | Pesticides<br>8081 | -   |                  |               |                                  |
| 2   | <u> </u>                              | ·:               |   |   |                        |   |                      |  | 1                  |   |                  |               |                                  |
| Sample No.                                  | Matrix *                              | Sample Date      | Sample Time   |   |                        |   |                      |  |                    |   |                  |               |                                  |
| J11VJ3                                      | SOIL                                  | 4/4/06           | 0835  | X   | $\overline{X}$         | X   | $\overline{\lambda}$ | X  | X                  |   |                  |               | F7-6                             |
| J11VJ4 .                                    | SOIL                                  |                  | 0835  | X   | X                      | X   | X                    | X  | X                  |   |                  |               | F7-6D                            |
| J11VJ5                                      | SOIL                                  |                  | 0845  | χ   | X                      | X   | $\lambda$            | X  | X                  |   |                  |               | F7-7                             |
| J11VJ6                                      | SOIL                                  |                  | 0822  | X   | X                      |   | X                    | X  | X                  |   | 1                |               | F7-8                             |
| J11VJ7                                      | SOIL                                  | 4/4/06           | 0905  | $\perp_{X}$                                 | X                      | X   | X                    | X  | X                  |   | 1                |               | F7-9                             |
| CHAIN OF POSSE                              |                                       | Sign/Prin        |   |   | SPE                    | CIAL INSTR                                    | UCTIO                | ON\$                                       | <u> </u>           | <del>, , , , , , , , , , , , , , , , , , , </del> |                  | <u> </u>      | Matrix *                         |
| Relinquished By/Removed Fre                 | Date/Time ! 50 C                      | Received By/Stor |   | hte/Time /500<br>4/4/00                     | 2   ( <sub>())</sub>   | ICP Metals - 601                              | l0 (Clies            | ıt List) (Aluminum, .                      | Antimony, A        | rsenie, Barium                                    | Bervilium, Bon   | ón.           | S∓Sail                           |
| Relinquished By/Removed Fro                 |                                       | Procinct Droppy  |   | <i>ፑ[ ႃ ] OU</i><br>bate/Time               | Cad                    | lmium, Calcium, (                             | Chromiu              | m, Cobalt, Copper,<br>Silicon, Silver, Sod | Iron, Lead, I      | Magnesium, Ma                                     | oganese, Molyb   | denum.        | SP=Solenous<br>SO=Soled          |
| 3728#2C 4                                   | 6-06 1030                             | 18 Sam           | -dea 4-6-06   | 103   |                        |   |                      | SMCOR 38761, 300                           | KTÜL A SKESÜ       | uni, zuic); Men                                   | cury - 1410 - (C | .· <b>Y</b> } | SI=Sindge<br>W - Water           |
| Relinguished DI/Removed Fro                 | m CA Date/Time                        | Received By/Stor | - The same is a | late/Time                                   | 7                      |   |                      | ,  |                    |   |                  |               | O=Oil<br>A=Air<br>DS=Drum Satids |
| Religialisted by/Removed Fro                | 1 1500 1 1500                         | FEO              |   | late/Time                                   |                        |   |                      |  |                    |   |                  |               | DL-Drug Liquids                  |
| 0/-000                                      | 4.7.06/0920                           |                  |   | 7.06/09                                     | لمدة                   |   |                      |  |                    |   |                  |               | WI=Wipe<br>L=Lujuid              |
| Relinquished By/Removed Fro                 | •                                     | Received By/Sio  |   | nte/l'ime                                   |                        | Landara                                       | دا ما ما داند        | ta.  |                    |   |                  |               | V=Vogetaline<br>X=Odert          |
| Relinquished By/Removed Fro                 | om Date/Time                          | Received By/Sto  | red la D  | Pate/Titue                                  | R                      | rsonnel not av<br>elinquish samp<br>ef#2Con_6 | ies from             | n 3728                                     |                    |   |                  |               |                                  |
|   | <del></del>                           |                  |   |   |                        | CI # 2 COII_ 9                                |                      | Y.CA                                       |                    |   |                  | <del></del>   |                                  |
| LABORATORY SECTION Recei                    | ived By                               |                  |   | Title                                       | :                      |   |                      |  |                    |   | . 1              | Date/Time     |                                  |
| FINAL SAMPLE Dispa<br>DISPOSITION           | osal Method                           |                  |   |   |                        | Dispo   | sed By               |  |                    | <u></u>   |                  | Date/Time     |                                  |
| PHI FC 014 (00/00/2001                      |                                       |                  | <del></del>   |   |                        | <del></del> -                                 |                      | <del></del>                                |                    | <del></del>                                       | <u></u> .        |               |                                  |

| Washington Closure Hanford   | CH  | AIN OF CUST                     | 100001                                     |                        |  | 2-032-030 Page 1 of 1                                    |  |                       |                 |                                 |              |   |
|--|---|---------------------------------|--|------------------------|--|--|--|-----------------------|-----------------|---------------------------------|--------------|---|
| Collector<br>Coffman   |   | ov Contact<br>Coffman           | Telephon<br>528-64                         |                        |  |  | Project Coordi<br>KESSNER, JH                                      | Rator 1               | Price Code      | ζK                              | _            | Mpmoran<br>V  |
| Project Designation<br>100-F Remaining Sites Burial Grounds - Soil Full Protoco  |   | ne Location<br>-F7 Verification |  |                        |  | -  | SAF No.<br>RC-032  | A                     | Air Quality     |                                 | 15           | BYAG  |
| Ice Chest No. ERC - 96 - 630   |   | o <b>zbook No.</b><br>  174-1   |  | COA<br>R607F720        | OA Metho<br>07F72000 Fed                             |  |  | ment                  |                 |                                 |              | <br>B<br>B<br>B   |
| Shipped Te EBERLINE SERVICES LIONVILLE   | Offsite   | Property No.                    | 0603                                       | 52                     |  |  | Bill of Lading   | Air Bill N            | SEE             | 051                             | ر م          |   |
| Possible sample hazards/remarks<br>NA  |   | Preservation                    | Noac                                       | Ceol 4C                | Cool 4C  | Cool   | 4C Cool 4C   | Coal 4C               |                 |                                 |              |   |
| Special Handling and/or Storage  |   | Type of Container               | ∌G   | #G                     | ıG   | <b>a</b> G   | #G   | ≇G                    |                 |                                 |              |   |
| Cool 4 degrees C   |   | No. of Container(s)             | '  | 1                      | l l  | 1  | l l  | 1                     |                 |                                 |              |   |
|  | j   | Volume                          | 250g                                       | 60mL                   | 60mL   | 1200   | nik i20m/  | l25mi.                |                 |                                 |              |   |
| SAMPLE ANALYSI O N C   | s   |                                 | See itam (1) in<br>Special<br>Impructions, | Chromium<br>Hex - 7196 | PC8e - 8062  | Scrai-V<br>1270A (                                       |  | Pesticides -<br>808 l |                 |                                 |              |   |
| Sample No Metrix *   | Sample Date   | Sample Time                     |  |                        |  |  |  |                       |                 |                                 |              | <b>有权相及</b> 。它  |
| J11VJ8 SOIL  | 4/4/06  | 0915                            | X  | X                      | X  | $\Box \lambda$   |  | X                     |                 | ·                               |              | F7-10   |
|  | <del></del>   |                                 |  |                        | <u> </u>   | L  |  |                       |                 |                                 | <u></u>      |   |
|  | <del></del>   | <del></del>                     | <del> </del> -                             |                        | <del> </del> -                                       | <b> </b> -   |  |                       | -{              |                                 | <del> </del> | <del> </del>  |
|  |   |                                 | <del> </del>                               |                        | <u> </u>   | <b> </b> -   |  |                       | <del></del>     |                                 |              |   |
| CHAIN OF POSSESSION  | Sign/Print  |                                 | .L   | SPE                    | CIAL INSTR   | UCTIO  | ONS  | <u> </u>              |                 |                                 | <u> </u>     | Matrix *  |
| Relinquished By/Removed From Date/Time  372842C 9-6-06 1030  Relinquished By/Removed From Date/Time  Relinquished By/Removed From Date/Time  1-0 C 4-7-06 1930  Relinquished By/Removed From Date/Time | Received By/Store Received By/Store Received By/Store Received By/Store Received By/Store | od in D                         | ste/Time                                   | 0920<br>Per rel        | CP Metals - 60<br>rium, Calcium,<br>et, Potassium, S | 10 (Chier<br>Chronic<br>ielenium<br>railable<br>(es fron | ot List) (Aluminum,<br>km, Cobalt, Copper,<br>Silicon, Silver, Sod | Iron, Lead. N         | dagnesium, Mary | pacese. Motyb<br>ny - 7470 - (C | denum.       | SmSout SE-Sudimust SO-Sudid Six Studge W = Water O-Oil A -Are OS-Orien Sudis DL-Dount Leptilik T-Tissue Wi-Wipe L-Liquid V-Vegetation X=Other |
| FINAL SAMPLE Disposal Method DISPOSITION   |   |                                 |  | <del></del>            | Dispo  | sed By   |  |                       |                 |                                 | Date/func    | <u></u>   |

# Appendix 5

**Data Validation Supporting Documentation** 

| VALIDATION<br>LEVEL:                     | A                  | В                     | 0                                       | D         | E                     |
|--|--------------------|-----------------------|---|-----------|-----------------------|
| PROJECT: / (                             | 507-F-7            | ;                     | DATA PACKAG                             | E: K029   | ٦.                    |
| VALIDATOR:                               | 441                | LAB:                  | LP                                      | DATE: 5/2 | 1/00                  |
|  |                    |                       | SDG: Ko:                                | 297       |                       |
|  | \                  | ANALYSES I            | PERFORMED                               |           |                       |
| SW-846 8260                              |                    | SW-846 8260<br>(TCLP) | SW-846 8270                             |           | SW-846 8270<br>(TCLP) |
|  |                    | _                     |   |           |                       |
| SAMPLES/MATI                             | RIX                | ·                     |   |           |                       |
| IIIVI)                                   | 2111120            | tuit h                | .2 111 <i>1</i> 1                       | L 211027  | YWITT                 |
|  |                    |                       |   |           | Soil                  |
| DATA PA Technical verification Comments: | on documentation p | resent?               |   |           | Yes No N/A            |
|  |                    |                       |   |           |                       |
| 2. INSTRUM                               |                    |                       | ON (Levels D and E                      |           | Yes No N/A            |
| Initial calibrations a                   |                    | _                     |   |           | 1                     |
| Continuing calibrati                     | ons acceptable?    |                       | *************************************** |           | Yes No N/A            |
| Standards traceable                      | ?                  |                       |   |           | Yes No N/A            |
| Standards expired? .                     |                    |                       |   |           | Yes No N/A            |
| Calculation check a                      | cceptable?         |                       | ••••••                                  | ••••••    | Yes No N/A            |
| Comments:                                |                    |                       |   |           | ` '                   |

| 3. BLANKS (Levels B, C, D, and E)                                  |              |
|--|--------------|
| Calibration blanks analyzed? (Levels D, E)                         | Yes No. 1/   |
| Calibration blank results acceptable? (Levels D, E)                | Yes No (N/   |
| Laboratory blanks analyzed?  | Yes No N/    |
| Laboratory blank results acceptable?                               |              |
| Field/trip blanks analyzed? (Levels C, D, E)                       |              |
| Field/trip blank results acceptable? (Levels C, D, E)              | Yes No       |
| Transcription/calculation errors? (Levels D, E)                    | Yes No 🚱     |
| Comments: MC - U in all sample                                     | NOFS         |
| Chlorebon - U in all - at Ral<br>Z-hexcre - Var Rol - 12 State - 4 |              |
| Z-hexare - Var ROL-12-35-C+8 -                                     | all detes    |
| Sato Sim   |              |
|  |              |
|  |              |
| 4. ACCURACY (Levels C, D, and E)                                   |              |
| Surrogates/system monitoring compounds analyzed?                   | Yes No N/    |
| Surrogate/system monitoring compound recoveries acceptable?        | Yes (Ng) N/. |
| Surrogates traceable? (Levels D, E)                                | Yes No (N/,  |
| Surrogates expired? (Levels D, E)                                  | Yes No 🕏     |
| MS/MSD samples analyzed?   | (Ye) No N/   |
| MS/MSD results acceptable?   | Yes No NA    |
| MS/MSD standards NIST traceable? (Levels D, E)                     | Yes No N     |
| MS/MSD standards? (Levels D, E)                                    | Yes No N/2   |
| LCS/BSS samples analyzed?  | Yes No N/    |
| LCS/BSS results acceptable?  | Yes No N/    |
| Standards traceable? (Levels D, E)                                 | \            |
| Standards expired? (Levels D, E)                                   | Yes No (N//  |
| Transcription/calculation errors? (Levels D, E)                    | Yes No (N//  |
| Performance audit sample(s) analyzed?                              | Yes (No. N// |
| Performance audit sample results acceptable?                       | Yes No (N/A  |
| Comments: Surr - J3 Benzer Tolver, eshylhenen                      | Styrent Kyly |
| -1,,,-   |              |
| J3, J4+ J6 - NO MS or MSD - Jal                                    |              |
|  |              |
|  | NO PAT       |

| 5.    | PRECISION (Levels C, D, and E)                               |                                       |
|-------|--|---------------------------------------|
| MS/I  | MSD samples analyzed?  | Yes No N/A                            |
| MS/I  | MSD RPD values acceptable?                                   | Yes No N/A                            |
| MS/I  | MSD standards NIST traceable? (Levels D, E)                  | Yes No (N/A)                          |
| MS/   | MSD standards expired? (Levels D, E)                         | Yes No (N/A)                          |
| Field | d duplicate RPD values acceptable?                           | Yes No N/A                            |
| Field | d split RPD values acceptable?                               | Yes No N/A                            |
| Tran  | nscription/calculation errors? (Levels D, E)                 | Yes No (N/A)                          |
| Com   | 13,14+11-wwws/nss-Jaly<br>Bronchen 7470-Jall hat J3,         | 74-76)                                |
| 6.    | SYSTEM PERFORMANCE (Levels D and E) rnal standards analyzed? | Vac Nicky                             |
|       |  | · · · · · · · · · · · · · · · · · · · |
|       | ernal standard areas acceptable?                             |                                       |
|       | rnal standard retention times acceptable?dards traceable?    | ł                                     |
|       | dards expired?   | J .                                   |
|       | scription/calculation errors?                                | 1                                     |
|       | nments:  |                                       |
|       |  |                                       |
| 7.    | HOLDING TIMES (all levels )                                  | ^^                                    |
| Samp  | ples properly preserved?                                     | Yes No N/A                            |
| Samp  | ple holding times acceptable?                                |                                       |
| Com   | nments:  |                                       |
|       |  |                                       |
|       |  |                                       |
|       |  |                                       |
|       |  |                                       |
|       |  |                                       |

| 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DET               | ECTION LIMITS (all |
|---|--------------------|
| levels)   |                    |
| Compound identification acceptable? (Levels D, E)               | Yes No (N/A        |
| Compound quantitation acceptable? (Levels D, E)                 | Yes No N/A         |
| Results reported for all requested analyses?                    | Yes No N/A         |
| Results supported in the raw data? (Levels D, E)                | Yes No N/A         |
| Samples properly prepared? (Levels D, E)                        | Yes No N/A         |
| Laboratory properly identified and coded all TIC? (Levels D, E) | Yes No (N/A)       |
| Detection limits meet RDL?                                      | Yes No N/A         |
| Transcription/calculation errors? (Levels D, E)                 | Yes No (N/A)       |
| Comments: 57 or   |                    |
|   |                    |
|   |                    |
|   |                    |
|   |                    |
|   |                    |
| 9. SAMPLE CLEANUP (Levels D and E)                              |                    |
| GPC cleanup performed?  | <b>;</b> }         |
| GPC check performed?  | 1.7                |
| GPC check recoveries acceptable?                                | Yes N/A            |
| GPC calibration performed?                                      | Yes No N/A         |
| GPC calibration check performed?                                | Yes No N/A         |
| GPC calibration check retention times acceptable?               | Yes N/A            |
| Check/calibration materials traceable?                          | Yes No N/A         |
| Check/calibration materials Expired?                            | Yes No N/A         |
| Analytical batch QC given similar cleanup?                      | Yes No N/A         |
| Transcription/Calculation Errors?                               | Yes No N/A         |
| Comments:   |                    |
|   |                    |
|   |                    |
|   |                    |
|   |                    |

Date:

2 June 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-F Remaining Sites Burial Grounds - Soil Full Protocol - Waste

Site 1607-F-7

Subject: Semivolatile - Data Package No. K0297-LLI

#### INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Wasting of Silver | negamene energie |      | Walidations: | Date Date  |
|-------------------|------------------|------|--------------|------------|
| J11VJ3            | 4/4/06           | Soil | С            | See note 1 |
| J11VJ4            | 4/4/06           | Soil | С            | See note 1 |
| J11VJ5            | 4/4/06           | Soil | С            | See note 1 |
| J11VJ6            | 4/4/06           | Soil | С            | See note 1 |
| J11VJ7            | 4/4/06           | Soil | С            | See note 1 |
| J11VJ8            | 4/4/06           | Soil | С            | See note 1 |

<sup>1 -</sup> Semivolatiles by 8270C.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

#### DATA QUALITY OBJECTIVES

### **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

#### Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

#### Field Blanks

No equipment blanks were submitted for analysis.

#### Accuracy

### Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the

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spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike duplicate result outside QC limits, all hexacloroethane (47%) and 1,2,4-trichlorobenzene (53%) results were qualified as estimates and flagged "J".

Due to a matrix spike result outside QC limits (10%), the 3,3'-dichlorobenzidine results in all samples were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (118%), all detected 2-methylnaphthalene results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

#### Precision

#### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

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Due to an RPD outside QC limits, all semivolatile results (except 4-chloroanaline, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,6-dinitrotoluene, 3-nitroanaline, 4-nitrophenol, 4-nitroanaline and benzo(k)fluoranthene) were qualified as estimates and flagged "J".

All other precision results were acceptable.

### Field Duplicate Samples

One set of field duplicates (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### · Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Forty-eight analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

### · Completeness

Data package No. K0297 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### **MINOR DEFICIENCIES**

The following minor deficiencies were noted:

 Due to a matrix spike duplicate result outside QC limits, all hexacloroethane (47%) and 1,2,4-trichlorobenzene (53%) results were qualified as estimates and flagged "J".

- Due to a matrix spike result outside QC limits (10%), the 3,3'-dichlorobenzidine results in all samples were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (118%), all detected 2-methylnaphthalene results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits, all semivolatile results (except 4-chloroanaline, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,6-dinitrotoluene, 3nitroanaline, 4-nitrophenol, 4-nitroanaline and benzo(k)fluoranthene) were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods

Forty-eight analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

#### REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

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# Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- U Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

  The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

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Appendix 2
Summary of Data Qualification

### SEMIVOLATILE DATA QUALIFICATION SUMMARY\*

| SDG #6287   |   | :##oje8t.44607-F-7    | PAGE <u>/1</u> 0F <u>1</u> |
|---|---|-----------------------|----------------------------|
| COMMENTS:   | 100000000000000000000000000000000000000 |                       |                            |
| COMPOUND  | QUALIFIER                               | SAMPLES AFFECTED      | REASON                     |
| Hexachloroethane 1,2,4-Trichlorobenzene   | J                                       | Atl                   | MSD recovery               |
| 2-Methyonaphthalene   | J                                       | All detected analytes | MS recovery                |
| 3,3-Dichlorobenzidine   | J                                       | All                   | MS recovery                |
| All analytes except the following:  | J                                       | All                   | RPD                        |
| 4-Chloroanaline 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,6-Dinitrotoluene 3-Nitroanaline 4-Nitrophenol 4-Nitroanaline Benzo(k)fluoranthene |   |                       |                            |

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

# Appendix 3

**Qualified Data Summary and Annotated Laboratory Reports** 

Page\_\_1\_\_ of\_\_2\_\_

| Project: WASHINGTON CLOSURE  | HANF | ORD     |     |           |     |         |    |         |    |         |    |          |    |
|------------------------------|------|---------|-----|-----------|-----|---------|----|---------|----|---------|----|----------|----|
|                              | SDG: |         |     |           |     |         |    |         |    |         |    |          |    |
| Sample Number                |      | J11VJ3  |     | J111VJ4   |     | J11VJ5  |    | J11VJ6  |    | J11VJ7  |    | J11VJ8   |    |
| Remarks                      |      |         |     | Duplicate |     |         |    |         |    |         |    |          |    |
| Sample Date                  |      | 4/4/06  | ,   | 4/4/06    |     | 4/4/06  |    | 4/4/06  |    | 4/4/06  |    | 4/4/06   |    |
| Extraction Date              |      | 4/17/06 |     | 4/17/06   |     | 4/17/06 |    | 4/17/06 |    | 4/17/06 |    | 4/17/06  |    |
| Analysis Date                |      | 4/19/06 |     | 4/19/06   |     | 4/19/06 |    | 4/20/06 |    | 4/20/06 |    | 4/19/06  |    |
| Semivolatile (8270C)         | RQL  | Result  | Q   | Result    | Q   | Result  | Q  | Result  | Q  | Result  | Q  | Result   | Q  |
| Phenol                       | 660  | 380     | IJ  | 380       | IJ  | 390     | IJ | 380     | IJ | 770     | 3  | 380      | UJ |
| bis(2-Chloroethyl)ether      | 660  | 380     | 3   | 380       | υJ  | 390     | IJ | 380     | IJ | 770     | 3  | 380      | UJ |
| 2-Chtorophenol               | 660  | 380     | บัง | 380       | UJ  | 390     | ÛĴ | 380     | UJ | 770     | IJ | 380      | บป |
| 1,3-Dichlorobenzene          | 660  | 380     | ŲJ  | 380       | UJ  | 390     | IJ | 380     | IJ | 770     | IJ | 380      | UJ |
| 1,4-Dichlorobenzene          | 660  | 380     | UJ  | 380       | UJ  | 390     | IJ | 380     | IJ | 770     | UJ | 380      | UJ |
| 1,2-Dichlorobenzene          | 660  | 380     | UJ  | 380       |     | 390     |    | 380     | IJ | 770     | UJ | 380      |    |
| 2-Methylphenol               | 660  | 380     | UJ  | 380       | IJ  | 390     | IJ | 380     | IJ | 770     | UJ | 380      | IJ |
| 2,2'-oxybis(1-chloropropane) | 660  | 380     | UJ  | 380       | UJ  | 390     | IJ | 380     | IJ | 770     | UJ | 380      | UJ |
| 3 and/or 4-Methylphenol      | 660  | 380     | IJ  | 380       | ÚJ  | 390     | UJ | 380     | IJ | 770     | IJ | 380      | IJ |
| N-Nitroso-di-n-propylamine   | 660  | 380     | UJ  | 380       | IJ  | 390     | UJ | 380     | IJ | 770     | UJ | 380      | UJ |
| Hexachloroethane             | 660  | 380     | UJ  | 380       | ียม | 390     | υJ | 380     | IJ | 770     | IJ | 380      | UJ |
| Nitrobenzene                 | 660  | 380     | IJ  | 380       | UJ  | 390     | IJ | 380     | υJ | 770     | IJ | 380      | υJ |
| Isophorone                   | 660  | 380     | UJ  | 380       | IJ  | 390     | IJ | 380     | IJ | 770     | IJ | 380      | IJ |
| 2-Nitrophenol                | 660  | 380     | IJ  | 380       | UJ  | 390     | บป | 380     | 3  | 770     | IJ | 380      | IJ |
| 2,4-Dimethylphenol           | 660  | 380     | υJ  | 380       | υJ  | 390     |    | 380     |    | 770     |    |          | UJ |
| bis(2-Chloroethoxy)methane   | 660  | 380     | UJ  | 380       | IJ  | 390     | IJ | 380     | IJ | 770     | UJ | 380      | IJ |
| 2,4-Dichlorophenol           | 660  | 380     | IJ  | 380       | υJ  | 390     | ŲĴ | 380     |    | 770     |    | 380      | UJ |
| 1,2,4-Trichlorobenzene       | 660  | 380     | บป  | 380       | UJ  | 390     | UJ | 380     | UJ | 770     | UJ | 380      |    |
| Naphthalene                  | 660  |         |     | 47        | J   | 390     | UJ | 68      |    | 97      | J  | 87       |    |
| 4-Chloroaniline              | Ľ    | 380     | U   | 380       | U   | 390     | U  | 380     |    | 770     | U  | 380      |    |
| Hexachlorobutadiene          | 660  | 380     | UJ  | 380       |     | 390     | IJ | 380     | UJ | 770     |    | 380      | -  |
| 4-Chloro-3-methylphenol      |      | 380     | Ų   | 380       |     | 390     |    | 380     |    | 770     | _  | 380      |    |
| 2-Methylnaphthalene          | 660  | 83      |     | 83        | _   |         | UJ | 88      |    | 150     |    | 120      |    |
| Hexachlorocyclopentadiene    | 660  | 380     | IJ  | 380       | UJ  | 390     | UJ | 380     | UJ | 770     |    |          | υJ |
| 2,4,6-Trichlorophenol        | L    | 380     | U   | 380       | U   | 390     | U  | 380     | U  | 770     |    | 380      | -  |
| 2,4,5-Trichlorophenol*       | 660  | 960     | UJ  | 960       | UJ  |         | IJ | 950     |    | 1900    | _  |          | UJ |
| 2-Chloronaphthalene          | 660  | 380     | UJ  | 380       | UJ  |         | UJ | 380     |    | 770     |    |          | UJ |
| 2-Nitroaniline*              | 660  | 960     | υJ  | 960       | UJ  | 970     | IJ | 950     | ÚJ | 1900    | IJ |          | UJ |
| Dimethylphthalate            | 660  | 380     | UJ  | 380       | UJ  | 390     | IJ | 380     |    |         | UJ | <u> </u> | บบ |
| Acenaphthylene               | 660  | 380     | UJ  | 380       | บม  |         | UJ | 380     | -  |         | UJ |          | UJ |
| 2,6-Dinitrotoluene           |      | 380     | U   | 380       | U   | 390     | U  | 380     | U  | 770     | U  | 380      | )U |

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| Project: WASHINGTON CLOSURE | HANE   | ORD     |     | ]         |     |         |             |         |    |   |    |         |     |
|-----------------------------|--------|---------|-----|-----------|-----|---------|-------------|---------|----|---|----|---------|-----|
| Laboratory: LLI SDG: K0297  |        |         | 1   |           |     |         |             |         |    |   |    |         |     |
| Sample Number               |        | J11VJ3  |     | J111VJ4   |     | J11VJ5  |             | J11VJ6  |    | J11VJ7                                  |    | J11VJ8  |     |
| Remarks                     |        |         |     | Duplicate |     |         |             |         |    | † · · · · · · · · · · · · · · · · · · · |    | 1       |     |
| Sample Date                 | 4/4/06 |         |     | 4/4/06 4  |     | 4/4/06  |             | 4/4/06  |    | 4/4/06                                  |    | 4/4/06  |     |
| Extraction Date             |        | 4/17/06 |     | 4/17/06   |     | 4/17/06 |             | 4/17/06 |    | 4/17/06                                 |    | 4/17/06 |     |
| Analysis Date               |        | 4/20/06 |     | 4/21/06   |     | 4/21/06 |             | 4/21/06 |    | 4/21/06                                 |    | 4/21/06 |     |
|                             | RQL    | Result  | Q   | Result    | Q   | Result  | Q           | Result  | Q  | Result                                  | Q  | Result  | Q   |
| 3-Nitroaniline*             |        | 960     |     | 960       | U_  | 970     | U           | 950     | U  | 1900                                    | υ  | 960     |     |
| Acenaphthene                | 660    | 380     | UJ  | 380       | UJ  | 390     | UJ          | 380     | ŲJ | 770                                     | IJ | 380     | UJ  |
| 2,4-Dinitrophenol*          | 660    | 960     | U   | 960       | υĴ  | 970     | UJ          | 950     | IJ | 1900                                    | IJ | 960     | UJ  |
| 4-Nitrophenol*              |        | 960     |     | 960       | U   | 970     | U           | 950     | U  | 1900                                    | Ü  | 960     |     |
| Dibenzofuran                | 660    | 380     | บม  | 380       | UJ  | 390     | UJ          | 23      | UJ | 770                                     | IJ | 26      | J   |
| 2,4-Dinitrotoluene          | 660    | 380     | บม  | 380       | IJ  | 390     | UJ          | 380     | UJ | 770                                     | ŲĴ | 380     | บัง |
| Diethylphthalate            | 660    | 380     | UJ  | 380       | UJ  | 390     | UJ          | 380     | IJ | 770                                     | IJ | 380     |     |
| 4-Chlorophenyl-phenyl ether | 660    | 380     | IJ  | 380       | UJ  | 390     | UJ          | 380     | IJ | 770                                     | บป | 380     | _   |
| Fluorene                    | 660    | 380     | IJ  | 380       | UJ  | 390     | IJ          | 380     | บม | 770                                     | IJ | 380     | IJ  |
| 4-Nitroaniline*             |        | 960     | U   | 960       | U . | 970     | IJ          | 950     | Ū  | 1900                                    | U  | 960     | U   |
| 4,6-Dinitro-2-methylphenol* | 660    | 960     | IJ  | 960       | υJ  | 970     | UJ          | 950     | IJ | 1900                                    | IJ | 960     | บม  |
| N-Nitrosodiphenylamine      | 660    | 380     | IJ  | 380       | UJ  | 390     | UJ          | 380     | ÜJ | 770                                     | UJ | 380     | IJ  |
| 4-Bromophenyl-phenyl ether  | 660    | 380     | เกา | 380       | IJ  | 390     | UJ          | 380     | IJ | 770                                     | IJ | 380     | UJ  |
| Hexachlorobenzene           | 660    | 380     | IJ  |           |     | 390     | UJ          | 380     | IJ | 770                                     | IJ | 380     | IJ  |
| Pentachlorophenol*          | 660    | 960     | บัง | 960       | ÜĴ  | 970     | UJ          | 950     | IJ | 1900                                    | IJ | 960     | UJ  |
| Phenanthrene                | 660    | 27      |     | 27        |     | 390     | UĴ          | 73      | J  | 100                                     | J  | 63      | J   |
| Anthracene                  | 660    | 380     |     | 380       |     | 390     |             | 380     |    | 770                                     | IJ | 380     | UJ  |
| Carbazole                   | 660    | 380     |     | 380       |     | 390     | UJ          | 380     | υJ | 770                                     | IJ | 380     | UJ  |
| Di-n-butylphthalate         | 660    | 380     |     | 24        | J   | 390     |             | 47      | _  | 770                                     | υJ | 30      | J   |
| Fluoranthene                | 660    | 380     |     | 380       |     | 390     |             | 62      |    | 72                                      | J  | 47      | J   |
| Pyrene                      | 660    | 30      |     | 380       |     | 390     |             | 54      | _  | 71                                      | 7  | 64      | J   |
| Butylbenzylphthalate        | 660    | 380     | _   | 380       |     | 390     |             | 24      |    |   |    | 380     |     |
| 3,3'-Dichlorobenzidine      | 660    |         |     |           |     | 390     |             | 380     |    | 770                                     | IJ | 380     | UJ  |
| Benzo(a)anthracene          | 660    |         |     | 380       |     | 390     |             | 26      |    | 770                                     |    | 21      |     |
| Chrysene                    | 660    |         |     | 380       |     | 390     |             | 47      |    | 76                                      | J  | 39      |     |
| bis(2-Ethylhexyl)phthalate  | 660    | 21      |     | 22        |     | 19      |             | 66      |    | 63                                      | J  | 29      |     |
| Di-n-octylphthalate         | 660    | 380     |     | 380       |     | 390     |             | 380     | _  | 770                                     |    | 380     |     |
| Benzo(b)fluoranthene        | 660    |         |     | 380       |     | 390     | <del></del> | 28      | J  | 48                                      | J  | 380     |     |
| Benzo(k)fluoranthene        |        | 380     |     | 380       |     | 390     | _           | 28      |    | 46                                      |    | 380     | U   |
| Benzo(a)pyrene              | 660    | 380     |     | 380       |     | 390     |             | 23      |    | 770                                     | UJ | 380     | ΠΊ  |
| Indeno(1,2,3-cd)pyrene      | 660    |         |     | 380       | UJ  | 390     | บบ          | 21      |    | 58                                      | Ĵ  | 380     | υJ  |
| Dibenz(a,h)anthracene       | 660    | 380     |     | 380       |     | 390     |             | 380     |    | 770                                     |    | 380     |     |
| Benzo(g,h,i)perylene        | 660    | 380     | UJ  | 380       | UJ  | 390     | UJ          | 20      | J  | 58                                      | J  | 380     | UJ  |

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Semivolatiles by GC/MS, HSL List

Report Date: 04/21/06 17:03

Client: TNUHANFORD RC-032 K0297 RFW Batch Number: 06041712 Work Order: 11343606001 Page: la ē Cust ID: **J11VJ3** J11VJ3 J11VJ3 J11VJ4 J11VJ5 J11VJ6 30000 001 MS RFW#: 001 001 MSD 002 003 004 Sample Information Matrix: SOIL SOIL SOTT SOIL SOIL SOIL 1.00 1.00 1.00 D.F.: 1.00 1.00 1.00 ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg Units: \* Nitrobenzene-d5 63 8 68 \* 47 64 ł 67 8 89 ¥ 82 ¥ 2-Fluorobiphenyl 67 ¥ 56 \* 66 ł \* ł Surrogate 69 91 Terphenvl-d14 ٩ Ł 85 70 ł 81 ł 99 Ŷ Recovery 90 Phenol-d5 84 ŧ 68 59 ¥ 67 92 ż 75 ł 2-Fluorophenol 66 53 Ł 84 と 2.4.6-Tribromophenol 105 76 92 83 \$ UI 380 103 Ł UI ロゴ IJ 380 390 380 bis(2-Chloroethyl)ether\_\_\_\_ U 83 f 380 55 Ł 380 Ū U 380 U 390 2-Chlorophenol\_\_\_\_ 380 13 95 Ł 64 Ł 380 IJ 390 U 380 T 1,3-Dichlorobenzene 77 Ł 380 U 50 \* 380 U 390 U 380 U 1,4-Dichlorobenzene\_\_\_\_\_ 380 U Ł 50 380 U 390 U 380 TI O1,2-Dichlorobenzene\_\_\_\_ 380 U 53 Ł 380 U 390 U 380 U 2-Methylphenol\_\_\_\_ 100 380 П 놓 ŧ 67 380 U 390 IJ U 380 2,2'-oxybis(1-Chloropropane) U 93 380 61 ł 380 U 390 11 380 4-Methylphenol\_\_\_\_ 380 U 104 ¥ 75 Ł 380 390 IJ 380 IJ N-Nitroso-di-n-propylamine IJ 98 380 65 ¥ 380 U 390 [] 380 IJ Hexachloroethane\_\_\_\_ 380 U 74 47 \* % 380 IJ 380 390 Ħ IJ Nitrobenzene\_\_\_\_\_ 380 IJ 78 Ł 53 ¥ 380 11 390 380 Isophorone 90 380 П ¥ 65 ž 380 Ħ 390 U 380 IJ 2-Nitrophenol\_\_\_\_ U 85 380 \* 58 ¥ 380 U 390 Ū 380 IJ 2,4-Dimethylphenol \_\_\_\_\_ U 380 ¥ 380 П 390 U 380 IJ bis (2-Chloroethoxy) methane IJ 85 380 ¥ 58 380 U 390 380 2,4-Dichlorophenol U 380 65 Ł 380 П U 390 380 U 1.2,4-Trichlorobenzene 380 78 53 \* % u 380 390 II 380 U Naphthalene J UV 108 46 ¥ 47 390 68 J 4-Chloroaniline\_\_\_\_\_ U 66 380 53 U 380 U 390 Ū 380 UJ Hexachlorobutadiene 380 85 55 Ł UIT UI 380 390 380 UI 4-Chloro-3-methylphenol\_\_\_\_\_ 95 380 U 71 Ł 380 U 390 U 380 U 83 % 83 AJ 2-Methylnaphthalene 118 \* % עבט 88 ZJ 62 웋 390 Hexachlorocyclopentadiene\_\_\_\_\_ 380 TU T υJ 72 42 욯 380 <sup>7</sup>∪ **∑** 390 380 ับโ 2,4,6-Trichlorophenol\_\_\_\_ Ü 380 101 ¥ 76 ¥. IJ 380 390 U 380 U 960 UJ 2,4,5-Trichlorophenol 108 Ł 950 以丁 ¥ 960 0丁 970 UJ \*= Outside of EPA CLP OC limits.

n 5/29/00

| Cust ID:                                 | J11VJ3         | J11VJ3       | <i>J</i> 11VJ3 | J11VJ <b>4</b> | J11VJ5  | J11VJ6   |  |
|--|----------------|--------------|----------------|----------------|---------|--|--|
| RFW#                                     | 001            | 001 MS       | 001 MSD        | 002            | 003     | 004  |  |
| -Chloronaphthalene                       | 380 U J        | 94 %         | 65 %           | 380 UJ         | 390 U J | 380 UJ   |  |
| -Nitroaniline                            | 960 U <b>J</b> | 100 %        | 72 %           | 960 U \        | 970 U   | 950 U 🕽  |  |
| imethylphthalate                         | 380 U 🤇        | 97 %         | 71 %           | 380 U          | 390 U 🕽 | 380 U  |  |
| cenaphthylene                            | 380 U J        | ·99 <b>k</b> | 69 <b>%</b>    | 380 U 🖣        | 390 ॻ   | 380 ⋃₩   |  |
| ,6-Dinitrotoluene                        |                | 96 %         | 71 %           | 380 Ü          | 390 U   | 380 U  |  |
| -Nitroaniline                            | 960 U          | 103 %        | 82 %           | 960 U          | 970 U   | 950 U  |  |
| cenaphthene                              |                | 96 <b>k</b>  | 67 %           | 380 U 🎜        | 390 U J | <u> </u>   |  |
| ,4-Dinitrophenol                         | 960 UI         | 92 🐉         | 58 %           | 960 U J        | 970 UJ  | 950 U J  |  |
| -Nitrophenol                             | 960 U          | 90 😵         | 70 %           | 960 U          | 970 U   | 950 U  |  |
| ibenzofuran                              | 380 U 🜙        | 103 %        | 69 %           | 380 U 丁        | 390 UJ  | كَنْ وَعَمْ الْحَالَةُ عَلَى الْحَالَةُ الْحَالِةُ الْحَالَةُ الْحَلَاقُ الْحَالَةُ الْحَلَاقُ الْحَلْقُ الْحَلْقُ الْحَلْقُ الْحَلْقُ الْحَلَاقُ الْحَلْقُ الْحَلِقُ الْحَلْقُ الْحَلْمُ الْحَلْمُ الْحَلْقُ الْحَلْقُ الْحَلِقُ الْحَلْقُ الْحَلْقُ الْ |  |
| ,4-Dinitrotoluene                        | 380 U          | 99 %         | 71 %           | 380 U 🕽        | 390 U Î | 380 U j  |  |
| oiethylphthalate                         |                | 97 %         | ∙ 70 %         | 380 U          | 390 U   | 380 U  |  |
| -Chlorophenyl-phenylether                |                | 94 %         | 66 %           | 380 U          | 390 U   | 380 U  |  |
| luorene                                  |                | 92 %         | 65 %           | 380 Ū <b>∜</b> | 390 ₺ ¥ | 380 U ₩  |  |
| -Nitroaniline                            | 960 U          | 67 %         | 62 %           | 960 U          | 970 U   | 950 U  |  |
| ,6-Dinitro-2-methylphenol                | 960 U J        | 106 🐉        | 73 %           | 960 U J        | 970 U J | 950 U J  |  |
| -Nitrosodiphenylamine (1)                |                | 84 %         | 60 <b>%</b>    | 380 U 1        | 390 U   | 380 U (  |  |
| -Bromophenyl-phenylether                 |                | 88 🕏         | 61 %           | 380 U          | 390 U   | 380 0  |  |
| iexachlorobenzene                        | 380 U          | 107 %        | 72 %           | 380 U          | 390 U   | 380 0  |  |
| Pentachlorophenol                        | 960 U I        | 146 * %      | 101 %          | 960 U          | 970 U   | 950 U  |  |
| Phenanthrene                             | 27             | 102 %        | 68 <b>%</b>    | 27             | 390 U   | 73   |  |
| Anthracene .                             | 380 Û l        | 95 . %       | 69 <b>%</b>    | 380 🗓          | 390 U   | 380 Ü  |  |
| Carbazole                                | 380 U          | 90 %         | 66 <b>%</b>    | 380 U          | 390 U   | 380 П  |  |
| Di-n-butylphthalate                      | 380 U          | 93 %         | 67 ક           | 24 7           | 390 U   | 47 J   |  |
| Pluoranthene                             | 380 U          | - 85 🕏       | 62 %           | 380 7          | 390 U   | 62 10  |  |
| Pyrene                                   | 30 Çak [       | 112 %        | 77 %           | 380 U          | 390 U   | 54 96  |  |
| Butylbenzylphthalate                     | 380 °U         | 113 %        | 80 %           | 380 U          | 390 U   | 24   |  |
| 3,3'-Dichlorobenzidine                   | 380 U          | 10 * *       | 31 %           | 380 U          | 390 0   | 380 U  |  |
| Benzo(a)anthracene                       | 380 U          | 93 🖁         | 68 %           | 380 U          | 390 0   | 26 JJ  |  |
| Chrysene                                 | 380 U          | 90 🕏         | 65 %           | 380 U          | 390 U   | 47   |  |
| ois(2-Ethylhexyl)phthalate               | 380            | 102 %        | 75 %           | 22             | 19 J    | 66 %   |  |
| Di-n-octyl phthalate                     | 380 °b~_)      | , 118 %      | 83 %           | 380 U          | 390 U   | 380 0  |  |
| Benzo(b) fluoranthene                    |                | 109 %        | 75 %           | 380 U 🕚        | 390 0   | 28 J   |  |
| Benzo(k)fluoranthene                     |                | 89 %         | 66 %           | 380 U          | 390 U   | 28 J   |  |
| Benzo(a)pyrene                           |                |              | 63 %           | 380 UJ         | 390 U T |  |  |
| Benzo(a)pyrene<br>Indeno(1,2,3-cd)pyrene | 380 U          | r 85 %       | 60 ₺           | 380 U 🕽        |         |  |  |
| Dibenz(a,h)anthracene                    | 380 U          | .† 87 ¥      | 61 %           | 380 U J        |         |  |  |
| Benzo(g,h,i)perylene                     |                | T 79 %       | 55 %           | 380 U J        | 390 U J | , , ,  |  |

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Report Date: 04/21/06 17:03

machina mancharthay, and.

Semivolatiles by GC/MS, HSL List

| •   | Cust ID:    | J11 <b>V</b> J7 |                     | J11VJ8     |          | SBLKWG      |            | SBLKW | ig BS |                |   |                    |                  |
|---|-------------|-----------------|---------------------|------------|----------|-------------|------------|-------|-------|----------------|---|--------------------|------------------|
| Sample  | RFW#:       | 005             | ı                   | 006        |          | 06LE0294    | -MB1       | 06LE0 | 294-1 | <b>(</b> B1    |   |                    |                  |
| Information                                       | Matrix:     | SOIL            |                     | SOIL       |          | SOI         | L          |       | SOIL  |                |   |                    |                  |
|   | D.F.:       | 2.0             |                     | 1.0        | 0        | 1           | .00        |       | 1.0   | 00             |   |                    |                  |
|   | Units:      | ug/K            | g                   | ug/K       | g        | ug          | /Kg        |       | ug/I  | ζg             |   | •                  |                  |
| Nitrobe   | nzene-d5    | 85              | *                   | 66         | ł        | 70          | ł          |       | 58    | 8              |   |                    |                  |
| Surrogate 2-Fluoro                                | biphenyl    | 92              | *                   | 69         | 퇕        | 68          | ł          |       | 64    | *              |   |                    |                  |
| Recovery Terph                                    | enyl-d14    | 88              | ક્ષ                 | 84.        | *        | 97          | ¥          |       | 74    | *              |   | -                  | •                |
| P   | henol-d5    | 79              | *                   | 69         | ŧ        | 70          | *          |       | 68    | 욯              |   |                    |                  |
| 2-Fluo  | rophenol.   | 69              | *                   | 65         | *        | 72          | *          | ;     | 66    | *              |   |                    |                  |
| 2,4,6-Tribro                                      | -           | 79              | <b>}</b><br>:=fl=== | 86         | <b>%</b> | 64<br>      |            |       | 79    | *              |   |                    |                  |
|   |             | 770             | υJ                  | 380        | T.       | <i>I</i> 33 |            |       | 80    | ==I⊥           |   | === <b>==</b> fl== | 2 <b>2</b> 55555 |
| Phenolbis(2-Chloroethyl)ether                     |             | 770             | σ (                 | 380        | U        | \ 33        | 0 υ        | ī     | 71    | f              |   |                    |                  |
| _   |             | 770             | <b>ט</b>            | 380        | U        | 33          | 0 0        | J     | 76    | ક              |   |                    |                  |
| 1,3-Dichlorobenzene                               |             | 770             | ט                   | 380        | Ü        | 33          | 0 T        | J     | 69    | ક્ષ            |   |                    |                  |
| 1,4-Dichlorobenzene                               |             | 770             | ט                   | 380        | U        | 33          | 0 0        | j     | 68    | ł              |   |                    |                  |
| 1,2-Dichlorobenzene                               |             | 770             | ט                   | 380        | U        | 33          | 0 E        | J     | 74    | · <b>&amp;</b> | - |                    |                  |
| 2-Methylphenol                                    |             | 770             | ָּט                 | 380        | U        | 33          | <b>0</b> 0 | J     | 73    | ક              |   |                    |                  |
| 2,2'-oxybis(1-Chloropropa                         |             | 770             | ט                   | 380        | U        | 33          | 0 T        | Ţ     | 70    | Ł              | • |                    |                  |
| 4-Methylphenol                                    |             | 770             | U                   | 380        | U        | 33          | ס ל        | J     | 79    | 2              |   |                    |                  |
| N-Nitroso-di-n-propylamin                         | e           | 770             | ע ∖                 | 380        | U        | 33          | 0 C        | J     | 78    | *              |   |                    |                  |
| Hexachloroethane                                  |             | 770             | <b>ט</b>            | 380        | U        | 33          | io t       | )     | 67    | ક              |   |                    |                  |
| Nitrobenzene                                      |             | 770             | U                   | 380        | U        | 33          | io t       | J     | 63    | *              |   |                    |                  |
| Isophorone  |             | 770             | U                   | 380        | U        | 33          | 10 T       | J     | 70    | ¥              |   |                    |                  |
| 2-Nitrophenol                                     |             | 770             | Ū                   | 380        | Ū        | 33          |            | J     | 65    | *              |   |                    |                  |
| 2,4-Dimethylphenol                                |             | 770             | U                   | 380        | U        | 33          |            | J     | 53    | 8              |   |                    |                  |
| bis (2-Chloroethoxy) methan                       | le          | 770             | U                   | 380        | U        | ] 33        |            | J     | 64    | *              |   |                    |                  |
| 2,4-Dichlorophenol                                |             | <b>7</b> 70     | U                   | 380        | บ        | 33          |            | J     | 66    | *              |   |                    |                  |
| 1,2,4-Trichlorobenzene                            |             | 770             | UV                  | 380        | 'n       | 33          |            | J     | 64    | *              |   |                    |                  |
| Naphthalene                                       |             | 97              | JELY.               |            | W.       |             | 30 t       |       | 65    | 8              |   |                    |                  |
| 4-Chloroaniline                                   |             | 770             | _                   | 380        |          |             | 30 t       |       | 77    | ¥              |   |                    |                  |
| Hexachlorobutadiene                               | ·           |                 | UJ                  | 380        |          |             | 30 T       |       | 71    | ફ              |   |                    |                  |
| 4-Chloro-3-methylphenol                           |             | 770             |                     | 380<br>120 | U        | _ 3:        | 30 T       |       | 71    | *              |   |                    |                  |
| 2-Methylnaphthalene                               | <del></del> | 150             | THE T               | 120        | 715      | <u>)</u> 3: | 0 t        |       | 69    | 옿              |   | V S/r              | 1.               |
| Hexachlorocyclopentadiene                         | ·           | 770             | ΄υ 🤰                | 380        | Ū        | <b>7</b> 3. | 30 C       |       | 62    | ¥              |   |                    | 4/06             |
| 2,4,6-Trichlorophenol                             |             | 770             | U T                 | 380        |          |             | 30 ι       |       | 78    | 윭              |   | IN IR              | < 0              |
| 2,4,5-Trichlorophenol<br>*= Outside of EPA CLP QC |             | 1900            | υJ                  | 960        | Ų        | J 8:        | 30 t       | J     | 71    | ¥              | • | >!                 |                  |

| Cust ID:   | J11VJ7             | J11VJ8         | SBLKWG        | SBLKWG BS      |                |
|--|--------------------|----------------|---------------|----------------|----------------|
| RFW#:  | 005                | 006            | 06LE0294-MB1  | 06LE0294-MB    | ı              |
| 2-Chloronaphthalene                                      | 770 UJ             | Ŭ 08E          | J 330 U       | 70             | <u></u>        |
| 2-Nitroaniline   | 1900 UJ            | 960 U          | J 830 U       | 76             | t              |
| Dimethylphthalate  |                    | 380 U          | Ť 330 U       | 76             | *              |
| Acenaphthylene   | 770 UJ             | 380 U          | J 330 D       | 72             | ł              |
| 2,6-Dinitrotoluene                                       | 770 U              | 380 U          | 330 U         | 74             | ł              |
| 3-Nitroaniline   | 1900 U             |                | 830 .U        | 100            | हे             |
| Acenaphthene   | 770 😈 🗓            | 380 U          | J 330 U       | 72             | <b>*</b>       |
| 2,4-Dinitrophenol  |                    |                | J 830 U       |                | ŧ              |
| 4-Nitrophenol  | 1900 U             | 960 U          | 830 U         |                | ·<br>F         |
| Dibenzofuran   |                    | 26 💋           | J 330 U       |                | e<br>E         |
| 2,4-Dinitrotoluene                                       |                    | 26 380 T       | 330 0         | · <del>-</del> | -<br>%         |
| Diethylphthalate   | 770 ט \            | 380 U          | 330 T         |                | ·<br>¥         |
| 4-Chlorophenyl-phenylether                               |                    | 380 U          |               |                | ę.             |
|  | 770 U              | 380 U          | 330 0         | · =            | •<br>}         |
| Fluorene4-Nitroaniline                                   | 1900 U             | 960 U          | 830 T         |                | ę.             |
| 4,6-Dinitro-2-methylphenol                               | 1900 U J           | 960 U          |               | . <del>-</del> | or<br>Se       |
| N-Nitrosodiphenylamine (1)                               | 770 0 3            | 380 U          | 330 T         | <del></del>    | ę.             |
| 4-Bromophenyl-phenylether                                |                    | 380 U          | 1             |                | •<br><b>\$</b> |
| Hexachlorobenzene  |                    | 380 U          |               |                | ł              |
| Pentachlorophenol  | 1900 U             | 960 U          | 830 t         |                | •<br>*         |
| Phenant brene  |                    | 63 Y           |               |                | *              |
| Anthracene   | 770                | 380 U          |               |                | *              |
| Carbazole  | 770 ט              | 380 U          |               | · <del>-</del> | 8              |
| Di-n-butylphthalate                                      |                    | 30 N           | 330 t         |                | 8              |
| Fluoranthene   | 72 /               | 47 1           | 4             | =              | <b>%</b> .     |
| Pyrene   | 72 / VI<br>71 / 10 | 64 👭           | 330 t         |                | § 1/1          |
| Butylbenzylphthalate                                     | 770 T              | 380 ບໍ່        | •             |                | * VL           |
| 3,3'-Dichlorobenzidine                                   | 770 U              | 380 U          | · i           | - <del>-</del> | *              |
| Benzo (a) anthracene                                     | ט 770              | 21 JJ          | 1             | 76             | • ,<br>& ,     |
| Chrysene   | 76                 | 21 NJ<br>39 AV | 330 0         | _              | *              |
| bis(2-Ethylhexyl)phthalate                               | 63                 | 29 7           | 330 t         | <u></u>        | *<br>*         |
| Di-n-octyl phthalate                                     | 770 U              | 380 U          |               |                | ę.             |
| Benzo(b) fluoranthene                                    | 48 48              | 380 U          |               | · <del>-</del> | ę<br>Ł         |
| Benzo(k)fluoranthene                                     | 46 KJ              | . 380 U        |               |                | ै<br>ह         |
| Renzo(a) pyrene  | 770 YU J           |                | J 330 t       | · <del>-</del> | * ·            |
| Benzo(a)pyrene Indeno(1,2,3-cd)pyrene                    | 58 JF J            | 380 ΰ          | J 330 t       | 70             | <b>*</b>       |
| Dibenz (a.h) anthracene                                  | 770 Û J            | 380 U          | T 330 t       | 70             | <b>}</b>       |
| Benzo(g,h,i)perylene                                     | 58 7 2 5           | 380 U          | <b>330</b> t  | J 66           | *<br>*         |
| Benzo(g,h,i)perylene (1) - Cannot be separated from Dipl | nenvlamine. *=     | Outside of     | EPA CLP OC 1: | imits.         | •              |
| (2) Camer so soperated from Dapa                         |                    | n.             | 106/-         |                |                |
|  |                    | Y/ ~ <         | つしんてしのし       |                |                |

## Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



#### **Case Narrative**

Client: TNU-HANFORD RC-032

LVL#: 0604L712

**SDG/SAF** # K0297/RC-032

W.O. #: 11343-606-001-9999-00 Date Received: 04-07-2006

#### **SEMIVOLATILE**

Six (6) soil samples were collected on 04-04-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 04-17-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 04-19,20-2006.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

- 1. Samples were extracted and analyzed within required holding time.
- 2. Non-target compounds were detected in the samples.
- 3. All surrogate recoveries were within acceptance criteria.
- 4. Five (5) of two hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 5. All blank spike recoveries were within acceptance criteria.
- 6. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.
- 7. Internal standard area and retention time criteria were met.
- 8. Sample J11VJ7 was analyzed using 2mL final volume due to the nature of the sample extract resulting in higher sample results. A copy of the Sample Extraction Record has been enclosed for more information.
- 9. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 1680 018



- 10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 11. I certify, that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

Jain Daniels

lain Daniels/ Laboratory Manager

Lionville Laboratory Incorporated

som\gorup\data\bna\tnu-hanford\0604-712.doc

4/25/01

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| Lionville Laboratory Sample Discrepancy Report (SDR) SDR #: dans I   | <u>36</u>    |
|--|--------------|
| Initiator: Robe-t Carden Batch: QuyC712 Parameter. Q015H   |              |
| Date: 4/2./4 Samples: Ms/msn Matrix: Gil   |              |
| Client: MI Hantoni Re031 Method: SWEADANCAWWICLPI Prep Batch: ALETTA   | 1            |
| 1. Reason for SDR a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C  |              |
| Transcription ErrorWrong Test CodeOther  | . !          |
| b. General DiscrepancyMissing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illeg   | nible        |
| Hold Time Exceeded Insufficient Sample Preservation Wrong Received Pas Improper Bottle Type Not Amenable to Analysis   |              |
| Note: Verified by [Log-In] or [Prep Group] (circle)signature/date:   | . •          |
| c. Problem (Include all relevant specific results; attach data if necessary)   | •            |
| MSD therentmethane spile recovery outside Octimits 47 20(20-110 \$ OKIN 1775/195   | <del>-</del> |
| 1950-124 Tainlandersone 538 (60-128 OK in 1956/35  |              |
| 195-3;31 Bulanberzilie 1 Wh (V-140%) an mso/35   | ·            |
| 2. Known or Probable Causes(s) 2.2'A.M. A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A  | <del> </del> |
| >> Viction of the Country of the property of t | hu gil       |
| offersplas/surgales are all guel not an extraction produce. Specialise   |              |
|  |              |
| 3. Discussion and Proposed Action Other Description:   |              |
| 3. Discussion and Proposed Action Other Description:  Re-log Fatin Retch   |              |
| Entire Batch   |              |
| Following Samples:<br>Re-leach   |              |
| Re-extract   |              |
| Re-digest / / / / / / / / / / / / / / / / / / /  |              |
| Change Test Code to  |              |
| Place On/Take Off Hold (circle)  |              |
| 4. Project Manager Instructionssignature/date: 4/4/00  |              |
| Concur with Proposed Action Disagree with Proposed Action; See instruction   |              |
| Include in Case Narrative  | i            |
| Client Contacted: Date/Person  | ĺ            |
| Add  | . 1          |
| Cancel   |              |
| 5. Final Actionsignature/date() Other Explanation:   |              |
| Verified re-[log][leach][extract][digest][analysis] (circle) Included in Case Narrative  |              |
| Hard Copy COC Revised  | ĺ            |
| Electronic COC Revised EDD Corrections Completed   | i            |
| When Final Action has been recorded, forward original to QA Specialist for distribution and filing.  | ļ            |
| Route Distribution of Completed SDR Route Distribution of Completed SDR  |              |
| X Initiator Metals: Beegle   |              |
| X Lab General Manager: M: Taylor Inorganic: Perrone GC/LC: Kiger   |              |
| Data Management: Stilwell  |              |
| Sample Prep: Beegle/Kiger Log-in: Perry  |              |
| Admin:<br>Other:   |              |

| Washington Close                                 | ure Hanford                    | ODY/SA                    | MPLE                          | E ANALY                                     | YSIS                  | REQUES                            | T                    | ]                                       | RC-032-030        | Page 2                       | of 3  |                  |  |
|--|--------------------------------|---------------------------|-------------------------------|---|-----------------------|-----------------------------------|----------------------|---|-------------------|------------------------------|---|------------------|--|
| Collector<br>Coffman                             |                                |                           | v Contact<br>offman           | Telephone<br>528-640                        |                       |                                   |                      | Project Coord<br>KESSNER, JH            |                   | Price Cod                    | e 81(   | Data Turnaround  |  |
| Project Designation<br>100-F Remaining Sites But | rial Grounds - Soil Full Proto |                           | e Location<br>F7 Verification |   |                       |                                   | i                    | SAF No.<br>RC-032                       |                   | Air Qua                      | lity 🗌  | 15000            |  |
| Ice Chest No. ERC-9                              | 6-030                          |                           | ebook No.<br>174-1            |   | COA<br>R607F720       |                                   | ·                    | Method of Shi<br>Fed Ex                 | oment             |                              |   |                  | 888                                    |
| Shipped To EBERLINE SERVICES                     | HONVILLE                       | Offsite I                 | roperty No. A                 | 100 3                                       | 500                   | A0603                             | 52                   | Bill of Ladim                           | /Air Biii         | No. 5                        | EE OSI  | PC               |  |
| POSSIBLE SAMPLE HAT                              | ZARDS/REMARKS                  | 1                         |                               | } }   |                       | }                                 | 1                    | 1                                       | }                 | - 1                          |   | 1                | }                                      |
| NA   |                                |                           | Preservation                  |   | Coet 4C               | Capl 4C                           | Cool                 |   | Cool 4            | -                            |   | <u> </u>         |  |
| Frankal Handling and in                          | . C4                           | 1                         | Type of Container             | aG  | ≇G                    | aG                                | aG                   | i aG                                    | aG                | 1                            |   | 1                |  |
| Special Haudling and/or<br>Cool 4 degrees C      | Storage                        |                           | No. of Container(s)           | 1   | 1                     | 1                                 | 1                    | ,                                       | 1                 |                              |   |                  |  |
| 0  |                                |                           | Volume                        | 250g  | 60mL                  | 60mi.                             | 120c                 | nL i20mL                                | 125m              | L                            |   |                  |  |
| 00021  | SAMPLE ANALY                   | sis                       |                               | See stem (1) in<br>Special<br>funtructions, | Chromism<br>Hex - 71% | PCBs - 8082                       | Squi-Vi<br>1270A (   |   | Pesticide<br>8081 |                              |   |                  |  |
| Sample No.                                       | Matrix *                       | Sample Date               | Sample Time                   |   |                       |                                   |                      |   |                   |                              |   |                  |  |
| J11VJ3   | SOIL                           | 4/4/06                    | 0835                          | X   | X                     | X                                 | $\lambda$            | CX                                      | 1 7               |                              |   |                  | E7-6                                   |
| J11VJ4 .   | SOIL                           |                           | 0835                          | X   | $\dot{X}$             | X                                 | X                    |   |                   |                              |   |                  | F7-6D                                  |
| J11VJ5   | SOIL                           | _ (                       | 0845                          | X   | X                     | X                                 | $\lambda$            | X                                       | Tx                |                              |   |                  | Fプフ                                    |
| J11VJ6   | SOIL                           |                           | 0822                          | X   | _X                    | X                                 | Х                    | X                                       | X                 |                              |   |                  | F7-8                                   |
| J11VJ7   | SOIL                           | 4/4/06                    | 0905                          | X   | X                     | X                                 | X                    |   | X                 |                              |   |                  | F7-9                                   |
| CHAIN OF POSSESS                                 |                                | Sign/Print                | Vames                         |   | SPE                   | CIAL INSTR                        | RUCTIO               | ONS                                     | <del>- 1</del>    | <del></del>                  | ···   | <del></del>      | Matrix *                               |
| Relinquished By/Removed From RT COFFM AN B       |                                | REFER #                   | 2C 3728 .                     | hate/Time / SD<br>4/4/00                    | (1)                   | ICP Metals - 60<br>imium, Calcium | 10 (Clies<br>Chromic | nt List) (Aluminum<br>um, Cobalt, Coppe | . Antimony        | Arsenic, Bar<br>Maynesium    | ium, Beryllium, Be<br>Manuanese, Mol          | oron,<br>Addenum | S=Soil<br>SP=Soskmens<br>SO=Sokal      |
| Relinquished By/Removed From 3728 #-20 4-4       | Date/Time<br>06 /030           | Received By Styl          | ) sides 4-6-06                | hate/Time                                   | Nicl                  | kel, Potassium, S                 | Selenium             | , Silicon, Silver, Sc                   | dium, Vare        | dium, Zinc):                 | Mercury - 7470 -                              | (CV)             | SleSinge<br>W + Wake<br>O=Oil          |
| Reliaguished MR conved From                      | WCH Date/Time / 1500           | Received By/Sine<br>FEO E |                               | hate/Time                                   | _                     |                                   |                      |   |                   |                              |   |                  | A^Air<br>DS=Druin Solids               |
| Relugaished By/Removed From                      | Date/Time                      | Received By/Store         | din D                         | Date/Time                                   |                       |                                   |                      |   |                   |                              |   |                  | DL-Drum Liquids<br>T=Tissac<br>W1=Wipe |
| Q-00x  | 4.7.06 / 0920<br>Date/Time     | Received By/Store         | muth 4                        | 7.04/0                                      | 7 <del>2</del>        |                                   |                      |   |                   |                              |   |                  | L=Lupuid<br>V=Vogstuline               |
| Relinquished By/Removed From                     | Inte/Time                      | Pe                        | ersonnel not a                | vaitable                                    | : 10                  |                                   |                      |   |                   | X=Other                      |   |                  |  |
| Relinquished By/Removed From                     | d lo E                         | late/Time                 | R                             | clinquish same                              | ples from             | m 3728<br><i>1<b>0 G</b></i>      |                      |   |                   |                              |   |                  |  |
| LABORATORY Received By SECTION                   |                                |                           |                               |   | <u>_</u>              |                                   |                      |   |                   | <del></del>                  | <u>, , , , , , , , , , , , , , , , , , , </u> | Date/Time        | <del>. l </del>                        |
| FINAL SAMPLE Dispose DISPOSITION                 |                                |                           |                               |   |                       |                                   | oscá By              |   |                   |                              | <u> </u>                                      | Date/Fime        |  |
| DU FF of CONSTRAIN                               | <del></del>                    |                           |                               |   |                       | ······                            |                      | ····                                    |                   | <del></del> - <del>-</del> - | <del></del>                                   |                  |  |

| Washington Closur  | <u>AMPLI</u>            | E ANALY                                     | YSIS                              | RE                 | EQUEST            |   | RC   | 032-030               | Page 3                                | of <u>3</u>  |                 |   |              |  |
|--|-------------------------|---|-----------------------------------|--------------------|-------------------|---|--|-----------------------|---------------------------------------|--------------|-----------------|---|--------------|--|
| Collector<br>Coffman   |                         |   | av Contact<br>Coffman             | Telephon<br>528-64 |                   |   |  |                       | iect Coordin<br>SSNER, JH             | ator         | rice Code       | ζ<                                      | Data Tur     | naroundo                               |
| Protect Designation<br>100-F Remaining Sites Buria                           | Grounds - Sail Full Pro |   | ing Location<br>7-F7 Verification |                    |                   | <del></del>                                 |  |                       | F No.<br>-032                         | A            | ir Quality      |   | 15           | DAYE                                   |
| Ice Chesi No. ERC - 9  | 6-030                   | Field L<br>EFL                              | oebook No.<br>-1!74-1             |                    | COA<br>R607F72    | 000   |  | •                     | thad of Ships<br>ed Ex                | nent .       |                 | - · · · · · · · · · · · · · · · · · · · |              | 000                                    |
| Shipped To EBERLINE SERVICES LIC   |                         | Offsite                                     | Property No.                      | 0603               | 352               |   |  | ВЩ                    | i of Lading/A                         | ir Bill No   | SEE             | OSF                                     | ا م          | 60                                     |
| POSSIBLE SAMPLE HAZA   | RDS/REMARKS             |   |                                   | }                  | ]                 |   |  |                       | ]                                     |              | 1               |   |              |  |
| NA .   |                         |   | Preservation                      | Noac               | Caol 4C           | Cool 4C                                     | Cool   |                       | Caol 4C                               | Cuol 4C      |                 |   |              |  |
| Special Handling and/or S  | torage                  |   | Type of Container                 | aG                 | aG                | #G  | aG   | 3<br>                 | aG                                    | aG<br>———    | · .             |   |              |  |
| Cool 4 degrees C   |                         |   | No. of Container(s)               | <u>  '</u>         | <u> </u>          | 1   | ,  |                       | 1 ' 1                                 | 1            | ]               | 1                                       |              |  |
| 0  |                         |   | Volume                            | 250g               | 60mi.             | 60ml.                                       | 120:   | mL                    | 120mL                                 | I25mL        |                 |   |              |  |
| 000022   |                         | See item (1) in<br>Special<br>Instructions. | Chromium<br>Hex - 7196            | PC8e - 8082        | Semi-V<br>8279A ( |   | VOA - 1260A<br>(TCL)                             | Pesticides -<br>808 l |                                       |              |                 |   |              |  |
|  |                         |   |                                   | <u> </u>           |                   | }   |  |                       |                                       | l            |                 | Ì                                       |              | ļ                                      |
| Sample No.   | . Matrix *              | Sample Date                                 | Sample Time                       | 24                 |                   |   | e e e e e e e e e e e e e e e e e e e            |                       |                                       |              |                 |   |              |  |
| J11VJ8   | SOIL                    | 4/4/06                                      | 0915                              | $X_{\perp}$        | X                 | X   |  | <del>(</del>          | $ \mathcal{X} $                       | X            |                 |   |              | F7-10                                  |
|  |                         |   |                                   |                    |                   |   |  |                       |                                       |              |                 |   |              |  |
|  |                         |   |                                   |                    |                   |   |  |                       |                                       | · · · · · ·  |                 | 1                                       |              |  |
|  |                         |   |                                   | 1                  |                   |   | <b>†</b>   |                       |                                       | <del></del>  | †               | <b>†</b>                                | <del> </del> |  |
|  |                         |   |                                   | t                  | 1                 |   | <del>                                     </del> |                       | 1                                     |              | <del> </del>    |   |              |  |
| CHAIN OF POSSESSIO   | N                       | Sign/Print                                  | Names                             | <u> </u>           | SPE               | CIAL INSTR                                  | RUCTIO   | ONS                   | 4                                     |              | <del></del>     | <u> </u>                                | <u> </u>     | Matrix *                               |
| Relinquished By/Removed From   | Date/Time /500          | Received By/Stor                            | ed in Di                          | ate/Time           | 700               | iCP Metals - 60                             |  |                       |                                       | ntimon. A    | mania Daniana I | ra 8ti 1b                               |              | Se-Suni                                |
| RTCOFFMAN PTCH<br>Relinquished By/Removed From                               | ma_4/4/06               | KEFER                                       | +2C, 3728                         | 4/4/04<br>ate/Time | ( Cad             | imium, Calcium,                             | Chromin  | una, Co               | obalt, Copper, In                     | ron, Lead. M | lagnesium, Man  | sanese. Molyb                           | denum.       | SE-Salimon SO-Solid                    |
|  | -06 1030                | 7.7   | lon 4-6-0                         |                    |                   | kel, Potassium, S                           | ocienium.  | ı, Silice             | on, Silver, Sodu                      | um, Venadiu  | m, Zinc); Merc  | ury - 7470 - ((                         | .:'V)        | Str Shedge<br>W = Water                |
|  | C# Date/Time            | Received By/Stor                            | red In D                          | ste/Time           |                   |   |  |                       |                                       |              |                 |   |              | O=Oil<br>A=Aar<br>OS=Oruna Sulais      |
| Relinquished By/Removed From   | Date/Time               | Received By Silv                            | rest M. C. D                      | ate/Time           | _                 |   |  |                       | ÷                                     |              |                 |   |              | OC-Drum Lapada<br>Terrisone<br>WinWipe |
| KAUCX 4.   |                         | £7-06                                       | 0931                              | <b>)</b>           |                   |   |  |                       |                                       |              |                 | L-Liquid<br>V=Vigetalium                |              |  |
| Relinquished By/Removed From   | red In D                | atc/Time                                    | Pe                                | rsonnel not av     | vailabke          | : to  |  |                       |                                       |              |                 | X=Diker                                 |              |  |
| Relinquished By/Removed From Date/Time Received By/Stored In                 |                         |   |                                   |                    | Re                | :linquish samp<br>:f# <u>ZC</u> on <u>4</u> | les from   | n 372<br>106          | 28<br><u>6</u>                        |              |                 |   |              |  |
| LABORATORY Received By SECTION   |                         |   |                                   |                    | tle               | ·   | <del></del> .                                    | <del></del> -         |                                       | <del></del>  |                 |   | Date/Time    |  |
| FINAL SAMPLE Disposal Method Disposal Method Disposal Method Disposal Method |                         |   |                                   |                    |                   |   |  |                       | · · · · · · · · · · · · · · · · · · · |              |                 |   |              |  |

**Data Validation Supporting Documentation** 

| VALIDATION<br>LEVEL: | A                  | В                  | (c)                                     | D           | E                     |
|----------------------|--------------------|--------------------|---|-------------|-----------------------|
| PROJECT:             | 07-F-7             |                    | DATA PACKAG                             | E: K0297    |                       |
| VALIDATOR:           | TLI                | LAB: LLT           |   | DATE: 5/2   | 1/06                  |
|                      |                    |                    | SDG:                                    | K0297       |                       |
|                      |                    | ANALYSES           | PERFORMED                               | <u>-:</u>   |                       |
| SW-846 8260          |                    | SW-846 8260 (TCLP) | SW-846 8270                             |             | SW-846 8270<br>(TCLP) |
|                      |                    | 1                  |   |             |                       |
| SAMPLES/MAT          | RIX                | <u> </u>           | <del></del>                             |             |                       |
| J11173               | PEVIIT             | JUVJS              | TIVIT                                   | , JIIV57    | ,                     |
| JUVJE                |                    |                    |   |             |                       |
|                      |                    |                    |   |             |                       |
|                      |                    |                    |   |             |                       |
|                      |                    |                    |   | <del></del> | Soil                  |
| ·                    |                    |                    |   |             |                       |
|                      | ACKAGE COMPL       |                    |   |             | Yet No N/A            |
|                      |                    |                    |   |             |                       |
| 2. INSTRUM           | MENT TUNING A      | ND CALIBRATIO      | ON (Levels D and )                      | Ε)          |                       |
| GC/MS tuning/perf    | formance check acc | eptable?           | •••••                                   |             | Yes No N/A            |
| Initial calibrations | acceptable?        |                    |   |             | Yes No N/A            |
| Continuing calibrat  | tions acceptable?  |                    | ••••••                                  | ••••••••••• | Yes No N/A            |
| Standards traceable  | ?                  |                    | •••••                                   |             | Yes No N/A            |
| •                    |                    |                    |   |             | \ 1                   |
| Calculation check a  | acceptable?        |                    | *************************************** | •••••       | Yes No N/             |
| Comments:            |                    |                    |   |             |                       |
|                      |                    |                    |   |             |                       |

| 3. BLANKS (Levels B, C, D, and E)                           |                                   |
|---|-----------------------------------|
| Calibration blanks analyzed? (Levels D, E)                  | Yes No N/4                        |
| Calibration blank results acceptable? (Levels D, E)         | Yes No WA                         |
| Laboratory blanks analyzed?                                 | Yes No N/A                        |
| Laboratory blank results acceptable?                        | Yes No N/A                        |
| Field/trip blanks analyzed? (Levels C, D, E)                | Yes No N/A                        |
| Field/trip blank results acceptable? (Levels C, D, E)       | Yes No N/A                        |
| Transcription/calculation errors? (Levels D, E)             | Yes No 🐼                          |
| Comments:   | NOFB                              |
|   |                                   |
| ·   |                                   |
|   |                                   |
|   |                                   |
|   |                                   |
| 4. ACCURACY (Levels C, D, and E)                            |                                   |
| Surrogates/system monitoring compounds analyzed?            |                                   |
| Surrogate/system monitoring compound recoveries acceptable? |                                   |
| Surrogates traceable? (Levels D, E)                         |                                   |
| Surrogates expired? (Levels D, E)                           | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ |
| MS/MSD samples analyzed?                                    |                                   |
| MS/MSD results acceptable?                                  | Yes No N/A                        |
| MS/MSD standards NIST traceable? (Levels D, E)              | Yes No (1/A                       |
| MS/MSD standards? (Levels D, E)                             | Yes No (N/A                       |
| LCS/BSS samples analyzed?                                   | Yes No N/A                        |
| LCS/BSS results acceptable?                                 | Ye No N/A                         |
| Standards traceable? (Levels D, E)                          | Yes No (N/A                       |
| Standards expired? (Levels D, E)                            | Yes No N/A                        |
| Transcription/calculation errors? (Levels D, E)             | Yes No W/A                        |
| Performance audit sample(s) analyzed?                       | Yes(No) N/A                       |
| Performance audit sample results acceptable?                | Yes No (N/A                       |
| Comments: hexaclorosethanh -MSD - Sall                      | no pas                            |
| 124 trichlaro benzon - MSD - Jaly                           |                                   |
| 2 methylene - M5 - detects only                             |                                   |
| 7,3-dictorohenenta - Ms - Jel                               |                                   |

| 5. PRECISION (Levels C, D, and E)  |      | 1       |       |
|--|------|---------|-------|
| MS/MSD samples analyzed?   | (Yes | Ne      | N/A   |
| MS/MSD RPD values acceptable?  | Yes  | $(N_0)$ | N/A   |
| MS/MSD standards NIST traceable? (Levels D, E)   | Yes  | No      | (N/A) |
| MS/MSD standards expired? (Levels D, E)  | Yes  | No      | NA    |
| Field duplicate RPD values acceptable?   |      | _       |       |
| Field split RPD values acceptable?   |      | -       |       |
| Transcription/calculation errors? (Levels D, E) Comments: 54 RPD15 outside QC limits - J all | Yes  | No      | (N/A) |
| Comments: 54 KPDIS outside QC limits - J all   | r    | <u></u> |       |
|  |      |         |       |
|  |      |         |       |
|  |      |         |       |
|  |      |         |       |
| 6. SYSTEM PERFORMANCE (Levels D and E)   |      |         | ·     |
| Internal standards analyzed?   | Yes  | No      | V/A   |
| Iinternal standard areas acceptable?   | Yes  | No      | N/A   |
| Internal standard retention times acceptable?  | Yes  | No      | N/A   |
| Standards traceable?   | Yes  | No      | N/A   |
| Standards expired?   | Yes  | No      | N/A   |
| Transcription/calculation errors?  | Yes  | No      | N/A   |
| Comments:  |      |         |       |
|  |      |         |       |
|  |      |         |       |
|  |      |         |       |
| 7. HOLDING TIMES (all levels )   |      |         |       |
| Samples properly preserved?  | Yes  | No      | N/A   |
| Sample holding times acceptable?   | Yes  | No      | N/A   |
| Comments:  |      |         |       |
|  |      |         |       |
|  |      |         |       |
|  |      |         |       |
|  |      |         |       |
|  |      |         |       |

| 8. COMPOUND IDENTIFICATION, QUANTITATION, AND DE                | TECTION LIMITS (all |
|---|---------------------|
| levels)   |                     |
| Compound identification acceptable? (Levels D, E)               |                     |
| Compound quantitation acceptable? (Levels D, E)                 | Yes No NA           |
| Results reported for all requested analyses?                    |                     |
| Results supported in the raw data? (Levels D, E)                | Yes No N/A          |
| Samples properly prepared? (Levels D, E)                        | Yes No N/A          |
| Laboratory properly identified and coded all TIC? (Levels D, E) | Yes No (N/A         |
| Detection limits meet RDL?                                      | Yes N/A             |
| Transcription/calculation errors? (Levels D, E)  Comments: 48   |                     |
| Comments.   |                     |
|   |                     |
|   |                     |
|   |                     |
|   |                     |
| 9. SAMPLE CLEANUP (Levels D and E)                              |                     |
| GPC cleanup performed?  | Yes No N/A          |
| GPC check performed?  | Yes No N/A          |
| GPC check recoveries acceptable?                                | Yes No N/A          |
| GPC calibration performed?                                      | Yes No N/A          |
| GPC calibration check performed?                                | Yes No N/A          |
| GPC calibration check retention times acceptable?               | Yes No N/A          |
| Check/calibration materials traceable?                          | Yes No N/A          |
| Check/calibration materials Expired?                            | Yes No N/A          |
| Analytical batch QC given similar cleanup?                      | Yes No N/A          |
| Transcription/Calculation Errors?                               | Yes No N/A          |
| Comments:   |                     |
|   |                     |
|   |                     |
|   |                     |
|   | ····                |

Date:

2 June 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100-F Remaining Sites Burial Grounds - Soil Full Protocol - Waste

Sites 1607-F-7

Subject:

Wet Chemistry - Data Package No. K0297-LLI

### INTRODUCTION

This memo presents the results of data validation on Data Package No. K0297 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| /Sample: D | Sample Dare | otvedia . | Validation | Date       |
|------------|-------------|-----------|------------|------------|
| J11VJ3     | 4/4/06      | Soil      | С          | See note 1 |
| J11VJ4     | 4/4/06      | Soil      | С          | See note 1 |
| J11VJ5     | 4/4/06      | Soil      | С          | See note 1 |
| J11VJ6     | 4/4/06      | Soil      | С          | See note 1 |
| J11VJ7     | 4/4/06      | Soil      | С          | See note 1 |
| J11VJ8     | 4/4/06      | Soil      | С          | See note 1 |

<sup>1 -</sup> Chromium VI by 7196A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, Rev. 4, February 2005). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

### **DATA QUALITY PARAMETERS**

### Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 30 days for chromium VI. If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

000001

All holding times were acceptable.

#### Method Blanks

### Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

#### Field (Equipment) Blank

No field blanks were submitted for analysis.

#### Accuracy

### Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (33.7%), all chromium VI results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### · Precision

### Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

#### Field Duplicate

One set of field duplicates (J11VJ3/J11VJ4) were submitted for analysis. Field duplicates are analyzed using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

#### Completeness

Data package KO297 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### MAJOR DEFICIENCIES

None found.

### **MINOR DEFICIENCIES**

The following minor deficiencies were noted:

Due to a matrix spike recovery outside QC limits (33.7%), all chromium VI results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- U Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration
  was greater than the IDL but less than the CRDL and is considered an
  estimated value.
- Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

#### METALS DATA QUALIFICATION SUMMARY\*

| SDG K0297   | FEARBOVET<br>FILE | Folescy 1607-F.7 | PAGE 1 OF 1 |
|-------------|-------------------|------------------|-------------|
| COMPOUND    | QUALIFIER         | SAMPLES AFFECTED | REASON      |
| Chromium VI | J                 | All              | MS recovery |

<sup>\* -</sup> The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

**Qualified Data Summary and Annotated Laboratory Reports** 

| Project: WASHING | TON CLOS | SURE | НА  | NFC | RD        |    |        |    | ].     |    |        |    |        |    |
|------------------|----------|------|-----|-----|-----------|----|--------|----|--------|----|--------|----|--------|----|
| Lab: LLI         |          |      |     |     |           |    |        |    | ]      |    |        |    |        |    |
| Sample Number    |          | J11  | VJ3 |     | J11VJ4    | •  | J11VJ5 |    | J11VJ6 |    | J11VJ7 |    | J11VJ8 |    |
| Remarks          |          |      |     |     | Duplicate |    |        |    |        |    |        |    |        |    |
| Sample Date      |          | 4/4  | /06 |     | 4/4/06    |    | 4/4/06 |    | 4/4/06 |    | 4/4/06 |    | 4/4/06 |    |
| Wet Chemistry    | RQL      | Resi | ult | Q   | Result    | Q  | Result | Q  | Result | Q  | Result | Q  | Result | Q  |
| Chromium VI      | 0.5      |      | 2.3 | IJ  | 2.3       | UJ | 2.3    | UJ | 2.3    | υJ | 2.3    | IJ | 2.3    | IJ |

#### Lionville Laboratory, Inc.

#### INORGANICS DATA SUMMARY REPORT 04/25/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0604L712

|        |                 |             |                  |          | REPORTING | DILUTION |
|--------|-----------------|-------------|------------------|----------|-----------|----------|
| SAMPLE | SITE ID         | ANALYTE     | RESULT           | Units    | LIMIT     | FACTOR   |
|        | ******          |             |                  |          |           |          |
| -001   | J11VJ3          | * Solida    | 86.8             | <b>3</b> | 0.01      | 1.0      |
|        |                 | Chromium VI | 2.3 u¶           | MG/KG    | 2.3       | 10.0     |
| -002   | J11VJ4          | * Solids    | 86.9             | k        | 0.01      | 1.0      |
|        |                 | Chromium VI | 2.3 u 🗐          | MG/KG    | 2.3       | 10.0     |
| -003   | J11VJ5          | * Solids    | 86.3<br>2.3 u Ji | •        | 0.01      | 1.0      |
|        |                 | Chromium VI | 2.3 u J1         | MG/KG    | 2.3       | 10.0     |
| -004   | J11VJ6          | * Solids    | 88.0<br>2.3 u Ji | •        | 0.01      | 1.0      |
|        |                 | Chromium VI | 2.3 u Ji         | MG/KG    | 2.3       | 10.0     |
| -005   | J11VJ7          | • Solids    | 86.5             |          | 0.01      | 1.0      |
|        |                 | Chromium VI | 2.3 uJ1          | MG/KG    | 2.3       | 10.0     |
| -006   | J11 <b>VJ</b> 8 | * Solids    | 86.6<br>2.3 uJ   | ŧ        | 0.01      | 1.0      |
|        |                 | Chromium VI | 2.3 uĴ1          | MG/KG    | 2.3       | 10.0     |

N 5/29/00

Laboratory Narrative and Chain-of-Custody Documentation



### **Analytical Report**

Client: TNU-HANFORD RC-032 K0297

LVL#: 0604L712

W.O.#: 11343-606-001-9999-00

Date Received: 04-07-06

#### INORGANIC NARRATIVE

1. This narrative covers the analyses of 6 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary. Elevated reporting limits for Chromium VI are the result of the necessity to dilute the samples to diminish the background color of the sample digestates.

LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state For a complete list of accrediting authorities and the corresponding accreditations. analytes/methods, please contact your Project Manager.

- 3. Sample holding times as required by the method and/or contract were met.
- 4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- The method blank for Chromium VI was within the method criteria. 5.
- The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits. 6.
- The matrix spike (MS) recovery for Insoluble Chromium VI was within the 75-125% control limits 7. however MS recovery for Soluble Chromium VI was below the control limit that may be attributed to the high background color of the digestate.
- 8. The replicate analysis for Chromium VI was within the 20% Relative Percent Difference (RPD) control limit.
- 9. Results for solid samples are reported on a dry weight basis.

I certify that this sample data package is in compliance with SOW requirements, both technically 10. and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

nip\i04-712

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.

| Washington Closur  | AMPLE ANALYSIS REQUEST RC-032-030 Page  |                                       |                                   |                      |                 |                                 | Page 2               | υ <u>Ι</u>                                |                        |   |                |         |   |  |
|--|---|---------------------------------------|-----------------------------------|----------------------|-----------------|---------------------------------|----------------------|---|------------------------|---|----------------|---------|---|--|
| Collector<br>Coffman   |   |                                       | any Contact<br>Coffman            | Telephone<br>528-640 |                 |                                 |                      | Project Coordi<br>KESSNER, JH             | ator                   | Price Code  | 8K             | Data Tu | rnaround  |  |
| Project Designation<br>100-F Remaining Sites Burial                    | Grounds - Soil Full Prote               |                                       | ing Location<br>7-F7 Verification |                      |                 |                                 | _                    | SAF No.<br>RC-032                         | /                      | Air Quality   \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ |                |         |   |  |
| ice Chest No. ERC-96   | -030                                    |                                       | Logbook No.<br>-1 174-1           |                      | COA<br>R607F720 | 00                              |                      | Method of Shipment Fed Ex                 |                        |   |                |         |   |  |
| Shipped To EBERLINE SERVICES LIK                                       | ONVILLE                                 | Offsite                               | Property No. 4                    | 00 3.                | 5 0             | A0603:                          | 52                   | Bill of Lading                            | C                      |   |                |         |   |  |
| POSSIBLE SAMPLE HAZA   | RDS/REMARKS                             |                                       |                                   |                      |                 |                                 |                      | 1   |                        |   |                |         |   |  |
| NA .   |   |                                       | Preservation                      | Nome                 | Cool 4C         | Cool 4C                         | Cool                 |   | Cool 4C                |   |                |         | <u> </u>  |  |
| Special Handling and/or S  | torage                                  |                                       | Type of Container                 | aG ∫                 | . aG            | aG                              |                      |   | aG                     |   | <u> </u>       |         | <u> </u>  |  |
| Cool 4 degrees C No. of Container(s)                                   |   |                                       |                                   |                      |                 |                                 | 1                    | 1   | 1                      |   |                | 1       |   |  |
| _  |   | Volume                                | 250g                              | 60mL                 | 60mL            | 120z                            | ni. 120mL            | 125mL                                     |                        |   |                |         |   |  |
| Sor item (1) in Special Instructions.  SAMPLE ANALYSIS                 |   |                                       |                                   |                      |                 | PCBs - \$0\$2                   | Sexui-V<br>8270A (   |   | Posticides<br>8081     | -   |                |         |   |  |
| 14   |   |                                       |                                   |                      |                 |                                 |                      |   |                        |   |                |         | ·   |  |
| Sample No.   | Matrix *                                | Sample Date                           |                                   |                      | 1               |                                 |                      |   | 製品製                    |   |                |         |   |  |
| J11VJ3   | SOIL                                    | 4/4/06                                | 0835                              |                      | $X_{-}$         | X                               | _2                   | CX  | X                      | `   |                |         | صا -7- يما  |  |
| J11VJ4   | . SOIL                                  |                                       | 0835                              | X                    | X               | X                               | X                    |   | X                      |   | <u> </u>       |         | F7-6D   |  |
| J11VJ5   | SOIL                                    |                                       | 0845                              | X                    | _X_             | $\perp_{X}$                     | X                    | X_  | X                      |   | <u> </u>       | <b></b> | F7-7  |  |
| J11VJ6   | SOIL                                    |                                       | 0855                              | X                    | X_              | X                               | Χ                    | $\mathcal{K}$                             | X                      |   |                |         | F7-8  |  |
| J11VJ7   | SOIL                                    | 4/4/06                                | 0905                              | X                    | X               | X                               | X                    | $\Delta \Lambda^{-}$                      | X                      |   | <u> </u>       |         | F7-9  |  |
| CHAIN OF POSSESSIO   |   | Sign/Prin                             |                                   |                      | SPEC            | CIAL INSTR                      | UCTI                 | ONS                                       |                        |   |                |         | Matrix *  |  |
|  | Date/Time   50 c                        | REFER                                 | #2C 3728 .                        | #/4/50               | (0.1            | CP Metals - 60<br>nium. Calcium | 10 (Clies<br>Chemnic | nt List) (Aluminum,<br>m, Cobalt, Copper, | Antimony, A            | Arsenic, Barium,<br>Mannesian, Mar                | Beryllium, Bor | ion,    | S-Soil<br>SE=Schmon                                 |  |
| Retinquished By/Removed From 3728#20 46                                | 06 /030                                 | Project Brist                         | Bendson 4-6-06                    | ete/Time             | Nick            | el, Potassium, S                | e lenium             | Silicon, Silver, Sod                      | ium, Vanad             | ium, Zinc); Merc                                  | ory - 7470 - ( | CV)     | SO-Suid<br>SI-Shulgs<br>W - Water                   |  |
| Religious led 19/Removed From  | C A Date/Time                           | Received By/Sto                       | red Ln D                          | ate/Time             |                 |                                 |                      |   |                        | -   |                | •       | O=Oil<br>AnAic<br>US=Drant Salids                   |  |
| Retinguished By/Removed From   | 7.06 / 1500<br>Date/fine<br>7.06 / 0920 | Received By/Slo                       | meAin D                           | nte/Time<br>7-04/0   | 720             |                                 |                      |   |                        |   |                |         | DL = Dram Liquid<br>TwYnsac<br>W =Wgb:<br>E= Liquid |  |
| Relinquished By/Removed From   | Per                                     | sonnel notav                          | milable                           | to                   |                 |                                 |                      |   | V=Vegetatum<br>X=Orber |   |                |         |   |  |
| Relinquished By/Removed From Date/Time Received By/Stored In Date/Time |   |                                       |                                   |                      |                 |                                 | iles fro             | m 3728                                    |                        |   |                |         |   |  |
| LABORATORY Received B  | <u>.</u> .                              |                                       |                                   |                      |                 |                                 |                      | Date/Time                                 |                        |   |                |         |   |  |
| FINAL SAMPLE Disposal M<br>DISPOSITION                                 | [ethod                                  | · · · · · · · · · · · · · · · · · · · |                                   | Dispo                | ned By          |                                 |                      | <u></u>                                   |                        | Date/Time   |                |         |   |  |
| BHI-EE-011 (08/29/2005)  |   |                                       | <del></del>                       |                      | · · · · ·       |                                 |                      |   |                        |   |                |         |   |  |

人名英格兰人姓氏西班牙名称 医克勒氏

| Collector Coffman Coffman RT. Coffman Star. Coffman Sample No. RT. Coffman Sample No. REPLIA Trumaroung RESEARCH RESEARCH RESEARCH Sample Date Sample No. REPLIA Trumaroung RESEARCH RESEARCH RESEARCH Sample Date Sample No. REPLIA Trumaroung RESEARCH RESE | Washington   | Closure Hanford    | CI  | HAIN OF CUST           | REQUE  | ST  |  | RC-032-030     |             | Page 1 of 1   |                                  |                 |   |             |              |
|--|--|--------------------|---|------------------------|--|---|--|----------------|-------------|---------------|----------------------------------|-----------------|---|-------------|--------------|
| Top of Container()   | Collector  |                    | Cemps   | LAY CORTACT            | Telep koa  | ie No.  |  | · · · ·        | Project Co  | ordinator     | Price (                          | Code            | ζK  |             |              |
| Billier Procest No. 106 0 35 25 2 EMETICAL PROPERTY NO. 106 0 35 25 2 EMETICAL PROCESSES STATES CONTROL TO SECOND STATES  | Project Designation<br>100-F Remaining   |                    |   |                        |  |   |  |                |             |               | Air Quality [                    |                 | 15DAY   |             |              |
| Billier Procest No. 106 0 35 25 2 EMETICAL PROPERTY NO. 106 0 35 25 2 EMETICAL PROCESSES STATES CONTROL TO SECOND STATES  | Ice Chest No. ER   | C-96-030           |   |                        |  |   |  |                |             | Shioment      |                                  |                 |   |             |              |
| Preservation  Preservation  Freedrich (Cool 4C)  Cool 4C)  Freedrich (Cool 4C)  Freedr | Shipped To   |                    | Offsice   | e Property No.         | 0603   | 352   |  |                | Bill of Lac | ling/Air Bill | No.                              | BEE             | 051   | ے د         |              |
| Special Handling and/or Storage Cool 4 degrees C  No. of Container(t)  Volume  100  Sample No.  Sample No.  Matrix *  Sample No.  Matrix *  Sample Date Sample Date Sample Time  Site Sim (1) is  Special Institution  Sample No.  Matrix *  Sample No.  Matrix *  Sample Date Sample Date Sample Date Sample Date Sample Date Sample No.  Matrix *  Special Handling and/or Storage  No. of Container(t)  I I I I I I I I I I I I I I I I I I I   |  | LE HAZARDS/REMARKS |   | Preservation           | None   | Caol 4C   | Cool 4C  | Cool           | 4C Cool 4   | C Cool        | c                                |                 |   |             |              |
| No. of Custainer(s)  Volume  250g 60nd. 120nd. 120nd. 120nd. 125nd. 125n | Special Handlins   | g and/or Storage   | ·   | Type of Container      |  | #G  | ∎G   | #C             | aG          | ıG            | ·                                |                 |   |             |              |
| Sample No.  Sample No.  Sample No.  Matrix *  Sample Date  Sample Time  Section (1) to Corresion Special Idea—1909 Idea—1902 I | , -  |                    | -   |                        |  |   | <u> </u>   | ļ              |             |               |                                  |                 |   | ļ           |              |
| Sample No. Matrix * Sample Date Sample Time  J11VJ8 SOIL 4/4/06 0915 X X X X X X X X X X X X X X X X X X X   | C  |                    | <del></del>   | Volume                 |  |   |  |                |             |               |                                  |                 |   |             |              |
| J11VJ8 SOIL 4/4/0 0915 X X X X X X X X X X X X X X X X X X X   | 00015  | SAMPLE ANALYS      |   | Special                |  |   |  |                |             |               | į                                | ·               |   |             |              |
| CHAIN OF POSSESSION  Sign/Print Names  Relinquished By/Removed From  Date/Time   500    Received By/Removed From   Date/Time   5700    Received By/Removed From   Date/Time   5700    Relinquished By/Removed From   Date/Time   6700    Received By/Stored In   6700    Relinquished By/Removed From   6700    Relinquished By/Removed From   6700    Relinquished By/Removed From   6700    Received By/Stored In   6700    Relinquished By/Removed From   6700     | Sample N   | o. Matrix *        | Sample Date   | Sample Time            |  |   |  |                |             |               | 編編                               |                 |   |             | <b>"建物</b> " |
| Reliaquished By/Removed From Date/Time 1500 Received By/Stored In Date/Time 1500 Rece | J11VJ8   | SOIL               | 4/4/06  | 0915                   | X_   | X   | X  | X              |             | -X            |                                  |                 |   |             | F7-10        |
| Reliaquished By/Removed From Date/Time 1500 Received By/Stored In Date/Time 1500 Rece |  |                    |   |                        |  |   |  |                |             |               |                                  |                 |   |             |              |
| Reliaquished By/Removed From Date/Time 1500 Received By/Stored In Date/Time 1500 Rece | CHAIN OF P   | OSSESSION          | Sign/Prin   | t Names                |  | 200   | CIAL INSTE   | l CTI          | ONS         |               |                                  |                 |   |             | Matrix *     |
| FINAL SAMPLE Disposel Method Disposed By Date/Time   | Relinquished By/Removed By/Remove | red in D           | 4/4/04  Nate/Time  Nate/Time  Aute/Time  Aute/Time  Aute/Time | 500 (1)<br>Cod<br>Nici | ICP Memis - 60 Imium, Calcium, S kel, Potassium, S rsonnel 1101 24 | 10 (Clier<br>Chromius<br>Selemium<br>vaitable<br>les from | nt Eist) (Alumium, Cobalt, Coj<br>Silicon, Silves<br>to<br>13728 | per, Iron, Lea | l. Magnesi  | ium, Many     | ganese, Molyb<br>ary - 7470 - (( | odenium,<br>CV) | S=Soil SE=Sectionism SU=Sobil SE=Statign W= Water G=Dil A=Arr DS=Drain Scient DI=Drain Scient |             |              |
|  | FINAL SAMPLE   | Disposal Method    | ·   |                        |  |   | Disp   | osed By        |             |               | <del></del> -                    | <del></del>     |   | Date/l'irre | ————         |

**Data Validation Supporting Documentation** 

| VALIDATION<br>LEVEL:          | A            | В            |                | D                                       | E                                |  |  |
|-------------------------------|--------------|--------------|----------------|---|----------------------------------|--|--|
| PROJECT:                      | 1607-F-7     | 7            | DATA PACKAG    | E: 1<029                                | 17                               |  |  |
| VALIDATOR:                    | TLI          | LAB: LL      | t              | - 4                                     | 1/00                             |  |  |
|                               |              |              | SDG:           | K0297                                   |                                  |  |  |
|                               |              | ANALYSES     | PERFORMED      |   |                                  |  |  |
| Anions/IC                     | тос          | тох          | TPH-418.1      | Oil and Grease                          | Alkalinity                       |  |  |
| Ammonia                       | BOD/COD      | Chloride     | Chromium-VI    | pН                                      | NO <sub>3</sub> /NO <sub>2</sub> |  |  |
| Sulfate                       | TDS          | TKN          | Phosphate      |   |                                  |  |  |
| SAMPLES/MAT                   | RIX          |              |                |   |                                  |  |  |
| J11V33                        | JUVI         | 1 3111/      | TS TILL        | te July                                 | T////+8                          |  |  |
| 311143                        | 01100        | 7 311101     | 12 31101       | N OFF VOP                               | JIIVY                            |  |  |
| <del> </del>                  |              |              |                |   |                                  |  |  |
|                               |              |              |                |   |                                  |  |  |
|                               |              |              |                |   |                                  |  |  |
|                               |              |              |                |   | 50,1                             |  |  |
|                               |              |              |                |   |                                  |  |  |
|                               | ACKAGE COMPL |              |                |   | $\delta$                         |  |  |
|                               |              |              |                |   | Yes (No) N/A                     |  |  |
| Comments:                     |              |              |                |   |                                  |  |  |
|                               | -            |              |                |   |                                  |  |  |
| <del></del>                   | <del>.</del> |              |                |   |                                  |  |  |
| A FRICTION IN                 | ARTIN DEPORT | ANCE AND CAL | IDD I MYONG (I |   |                                  |  |  |
|                               | MENT PERFORM |              |                |   |                                  |  |  |
|                               |              |              |                | *************************************** | 1 4                              |  |  |
|                               |              |              |                |   | 1                                |  |  |
|                               | _            |              |                |   | 1                                |  |  |
| CV and CCV checks acceptable? |              |              |                |   |                                  |  |  |
|                               |              |              |                | *************************************** | ,                                |  |  |
| _                             |              |              |                |   | ( )                              |  |  |
|                               |              |              |                |   |                                  |  |  |
|                               |              |              |                |   |                                  |  |  |

| 3. BLANKS (Levels B, C, D, and E)                                       |              |
|---|--------------|
| ICB and CCB checks performed for all applicable analyses? (Levels D, E) | Yes No NA    |
| ICB and CCB results acceptable? (Levels D, E)                           | Yes No N/A   |
| Laboratory blanks analyzed?   |              |
| Laboratory blank results acceptable?                                    | ~~~          |
| Field blanks analyzed? (Levels C, D, E)                                 | Yes No N/A   |
| Field blank results acceptable? (Levels C, D, E)                        | Yes No N/A   |
| Transcription/calculation errors? (Levels D, E)                         | Yes No (N/A  |
| Comments:   |              |
|   |              |
|   |              |
|   |              |
| 4. ACCURACY (Levels C, D, and E)  |              |
| Spike samples analyzed?   |              |
| Spike recoveries acceptable?  | Yes (No) N/A |
| Sike standards NIST traceable? (Levels D, E)                            | Yes No (N/A  |
| Spike standards expired? (Levels D, E)                                  |              |
| LCS/BSS samples analyzed?   | (Yes)No N/A  |
| LCS/BSS results acceptable?   | Ye No N/A    |
| Standards traceable? (Levels D, E)                                      | Yes No N/A   |
| Standards expired? (Levels D, E)  | Yes No 144   |
| Transcription/calculation errors? (Levels D, E)                         | Yes No (N/A  |
| Performance audit sample(s) analyzed?                                   | Yes N/A      |
| Performance audit sample results acceptable?                            | Yes No (N/A  |
| Comments: Sol CRUI 33.770 Jall  | nopas        |
|   | • •          |
| Comments: 301 Close 3). 77  | γισμ         |
|   |              |
|   |              |

| 5.     | PRECISION (Levels C, D, and E)              |          | ١.  |      |
|--------|---|----------|-----|------|
| Dupli  | icate RPD values acceptable?                |          | No  | N/A  |
| Dupli  |   | No       | N/A |      |
| MS/M   | MSD standards NIST traceable? (Levels D, E) | Yes      | Nø  | N/A  |
| MS/M   | MSD standards expired? (Levels D, E)        | Yes      | No  | (N/A |
| Field  | duplicate RPD values acceptable?            | Yel      | `No | N/A  |
| Field  | split RPD values acceptable?                | Yes      | No  | NA   |
| Transe | scription/calculation errors? (Levels D, E) | Yes      | No  | (M)  |
| Comn   | ments:                                      |          |     |      |
|        |   |          |     |      |
|        |   |          |     |      |
|        |   | W C      |     |      |
|        |   |          |     |      |
|        |   |          |     |      |
| 6.     | HOLDING TIMES (all levels)                  | $\sim$   |     |      |
| Sampl  | les properly preserved?                     | Yes      | No  | N/A  |
| Sampl  | le holding times acceptable?                | Ye       | No  | N/A  |
| Comn   | ments:                                      | <u> </u> |     |      |
|        | 1.12.11                                     |          |     |      |
|        |   |          |     |      |
|        |   |          |     |      |
|        |   |          |     |      |
|        |   |          |     |      |
|        |   |          |     |      |

| 7. RESULT QUANTITATION AND DETECTION LIMITS (all levels) |              |
|--|--------------|
| Results reported for all requested analyses?             | ( Yes No N/A |
| Results supported in the raw data? (Levels D, E)         | Yes No N/A   |
| Samples properly prepared? (Levels D, E)                 |              |
| Detection limits meet RDL?                               | Yes No N/A   |
| Transcription/calculation errors? (Levels D, E)          |              |
| Comments: dell over                                      |              |
|  |              |
|  |              |
|  |              |
|  |              |
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|  |              |
|  |              |
|  |              |

Additional Documentation Requested by Client

#### Lionville Laboratory, Inc.

#### INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/25/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

06LVI024-MB1

BLANK10

LVL LOT #: 0604L712

0.20

0.20 u MG/KG

|        | **      |         |        |       | *******   |          |
|--------|---------|---------|--------|-------|-----------|----------|
| SAMPLE | SITE ID | ANALYTE | RESULT | Units | LIMIT     | FACTOR   |
|        |         |         | *      |       | REPORTING | DILUTION |

#### Lichville Laboratory, Inc.

#### INORGANICS ACCURACY REPORT 04/25/06

CLIENT: TNUHANFORD RC-032 K0297 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0604L712

|         |              |                       | SPIKED | INITIAL | SPIKED |        | DILUTION     |
|---------|--------------|-----------------------|--------|---------|--------|--------|--------------|
| SAMPLE  | SITE ID      | ANALYTE               | Sample | result  | TRUOMA | *RECOV | FACTOR (SPK) |
| #===F#  |              | ***                   |        |         |        |        | ******       |
| -003    | J11VJŠ       | Soluble Chromium VI   | 1.6 u  | 2.3 ს   | 4.5    | 33.7   | 10.0         |
|         |              | Insoluble Chromium VI | 1260   | 2.3 u   | 1260   | 100    | 100          |
| BLANK10 | 06LV1024-MB1 | Soluble Chromium VI   | 4.0    | 0.20u   | 4.0    | 101.2  | 1.0          |
|         |              | Insoluble Chromium VI | 1230   | 0.20u   | 1040   | 117.7  | 100          |

#### Lionville Laboratory, Inc.

#### INORGANICS PRECISION REPORT 04/25/06

CLIENT: TNUHANFORD RC-032 K0297

LVL LOT #: 0604L712

WORK ORDER: 11343-606-001-9999-00

|         |         |             | INTLIWE |                   |       | DIBOTION     |
|---------|---------|-------------|---------|-------------------|-------|--------------|
| SAMPLE  | SITE ID | ANALYTE     | RESULT  | REPLICATE         | RPD   | FACTOR (REP) |
| ======= |         |             |         | <b>医条件损伤法医</b> 医医 | ***** | *******      |
| -003REP | J11VJ5  | Chromium VI | 2.3 u   | ີ 2.3 ບ           | NC    | 10.0         |